DRINKING DRIVING
COUNTERATTACK

A joint program of the Ministry of Attorney General
and the Insurance Corporation of British Columbia.

ALCOHOL-RELATED CASUALTY TRAFFIC ACCIDENTS in BRITISH COLUMBIA

Province of British Columbia
Ministry of Attorney General

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DRINKING DRIVING
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ALCOHOL-RELATED CASUALTY TRAFFIC ACCIDENTS in BRITISH COLUMBIA

* Measurement & Trends *
* Locations & Circumstances *
* The Drivers: Alcohol, Age, Experience *

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February, 1984

Note: The views expressed in this publication are entirely those of the writer and do not necessarily represent the views or policies of the Ministry of Attorney General or the Province of British Columbia.

FOREWORD

The importance of research in any field of endeavour is generally recognized, if not always adopted. But, research relative to road accidents is absolutely critical to the development of effective countermeasures. The road transportation systems of the industrial world vastly enriches and enhances our lives but, in so doing, exacts a toll in human death and injury which is unmatched by any other man created activity.

This publication is intended to contribute to the tragically slow but growing body of knowledge on this topic. It brings together studies completed by Bill Mercer, Ph.D. during 1983 which were originally distributed to a limited audience of police traffic law enforcement personnel, traffic safety professionals, educators and those groups and individuals who are part of the CounterAttack/Traffic safety network which extends throughout the Province of British Columbia.

CounterAttack is a program, established by the British Columbia government in 1977, to reduce drinking driving accidents and costs. The program, resourced by the Ministry of Attorney General and the Insurance Corporation of British Columbia, is structured as an integrated program with five main elements: Police; Education and Community; Public Information; Law and Policy review; and Research.

Dr. Mercer's contribution to an improved management information system for traffic safety workers in British Columbia is highly valued. It is hoped this publication will be useful to workers in this field in other jurisdictions.

R.J. Boyle
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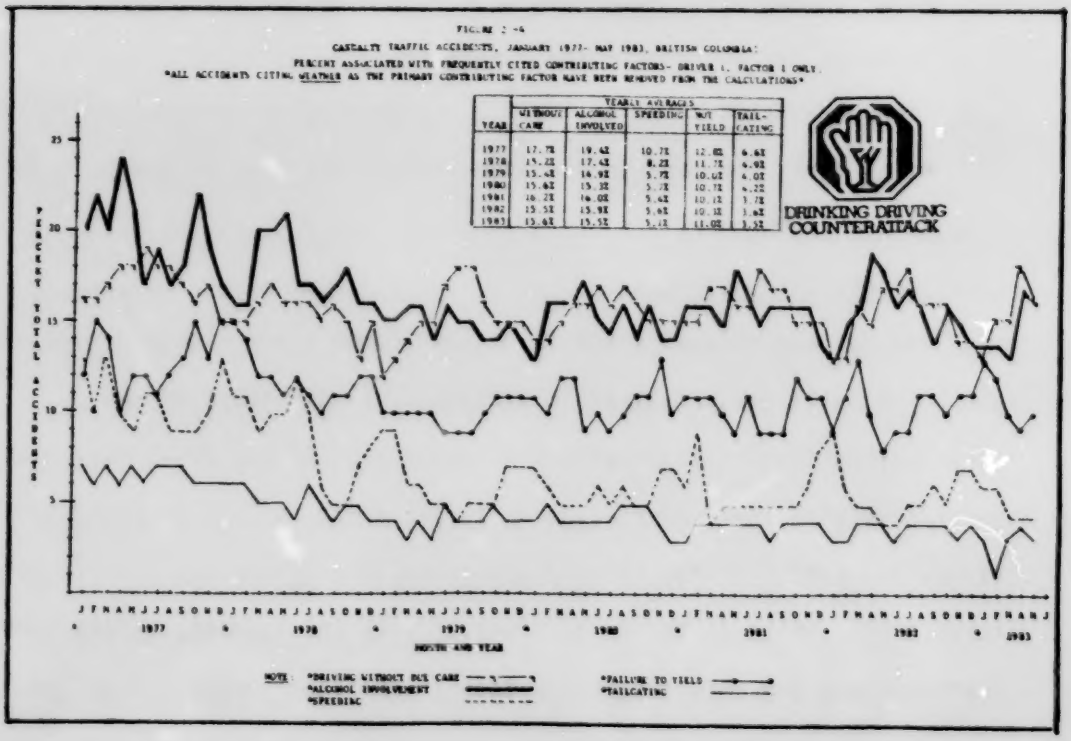
EXECUTIVE SUMMARY

The Costs:

Within the last six and one half years in British Columbia at least one thousand, six hundred and thiry-one people have been killed and forty-six thousand, seven hundred and thirty-nine have been injured in traffic accidents caused primarily by drinking drivers. In 1982 alone, accidents associated with drinking driving cost the provice at least one hundred and four million dollars in insurance claims, medical claims and Justice System costs. Regarding the burden on the Justice System, in 1982, about 30% of the persons charged by the police under the Canadian Criminal Code, 30% of the completed Criminal Code cases in the courts, and 34% of the admissions to correctional institutions were Driving While Impaired charge related. Arguably, drinking driving extracts more costs from society than does any other single behaviour.

Measurement and Trends:


CASUALTY TRAFFIC ACCIDENTS, JANUARY 1977- MAY 1983, BRITISH COLUMBIA:
PERCENT ASSOCIATED WITH FREQUENTLY CITED CONTRIBUTING FACTORS- DRIVER 1, FACTOR 1 ONLY.
ALL ACCIDENTS CITING WEATHER AS THE PRIMARY CONTRIBUTING FACTOR HAVE BEEN REMOVED FROM THE CALCULATIONS
YEARLY AVERAGES
YEAR
WITHOUT CARE
ALCOHOL INVOLVED
SPEEDING
W/I YIELD
TAIL-GATING
1977 17.7% 19.4% 10.7% 12.0% 6.6%
1978 15.2% 17.4% 8.2% 11.7% 6.0%
1979 15.4% 16.9% 9.7% 10.6% 6.0%
1980 15.6% 15.3% 9.7% 10.7% 6.2%
1981 16.2% 16.0% 9.6% 10.1% 3.7%
1982 15.5% 15.9% 9.6% 10.1% 3.6%
1983 15.6% 15.5% 9.4% 11.0% 3.5%
DRINKING DRIVING COUNTERATTACK
PERCENT TOTAL ACCIDENTS
MONTH AND YEAR
NOTE: *DRIVING WITHOUT DUE CARE
*ALCOHOL INVOLVEMENT
*SPEEDING
*FAILURE TO YIELD
*TAILGATING

Section I on the measurement of and trends in factors contributing to casualty traffic accidents suggests that:

1. Measurement of the causes of these accidents is difficult at best, but using the contributing factor codes from the Traffic Accident Report Form (MV104) completed by the attending officer at all casualty accidents is reasonably reliable and acceptably valid approach.
2. An examination of all contributing factors to these casualty accidents reveals that Driving Without Due Care is the most frequently cited factor, with Alcohol Involvement, Unsafe Speed and Failure to Yield Right of Way all at about the same level as the second most frequently cited factors.
3. Since 1977 the proportion of alcohol-related casualty accidents has decreased by about 10% and has been stable for the past three years, while the actual likelihood of being charged with Driving While Impaired has decreased from 1977 levels.
4. Alcohol-related casualty traffic accidents show seasonal variations, being least frequent in December-January and most frequent in the Spring and Summer.

Location and Circumstances:

Not surprisingly, Section II on the location and circumstances of alcohol-related casualty traffic accidents illustrates that the contributing factors associated with these traffic accidents vary with the general driving environment - in municipal areas Failure to Yield the Right of Way and Following too Closely are cited more frequently than in more rural areas, while in the rural areas Alcohol Involvement, Unsafe Speed and Weather are cited more frequently than in municipal areas. Additionally,

Following too Closely is cited as a contributing factor frequently on freeways, while Driving Without Due Care is cited with about the same frequently in municipal as in rural areas.

In addition, when compared to the non-alcohol related accident, alcohol-related accidents were more likely to have:

1. Been a single-vehicle accident where the driver lost control of the vehicle, ran off the road, and hit an object at the side of the road.
2. Occurred late in the week, late in the day, and in the Spring as opposed to the Winter.
3. Occurred on a more-or-less nondescript portion of the road, between intersections, with no traffic control devices in the immediate area (because none are needed). The land use in the area was likely to be a Family/Residential or an Agricultural/Undeveloped area, although campgrounds and recreational areas also had a high proportion (but low absolute number) of alcohol-related accidents. Posted speed zones did not show any particular patterns with regard to these sorts of accidents.
4. Occurred in high proportions in good driving weather and good road conditions and in low proportions in bad conditions and bad weather. While high proportions of alcohol-related accidents were associated with "dark" (i.e. night) conditions, good ambient lighting did appear to reduce these proportions.
5. Occurred in curved road sections as opposed to straight sections, while road grade and surface composition did not appear to appreciably affect alcohol-related accidents.

The exceptional thing about the situational characteristics of

alcohol-related casualty traffic accidents is that there are very few situational variables that can be pointed to in order to either explain or combat these accidents. It would seem that the drinking driver simply drives off the road when the road curves and hits an object off the road. The weather, road conditions, road surface, traffic control devices, posted speed zones, land use areas and so on are all either better than average for driving or make no particular difference one way or the other to the likelihood of the alcohol-related accident. Arguably, better lighting conditions and better barriers at road sides (especially at curves) might reduce these accidents, as might stronger enforcement efforts late at night, late in the week, and during the Spring. However, by elimination of the largely situational variables, one is left with the unavoidable conclusion that the primary precipitator and cause of these accidents is the inability of the driver to handle the vehicle after drinking. Unfortunately, the driver is the most difficult variable to change.

The Drivers - Alcohol, Age, Experience:

In Section III on the drivers in alcohol-related casualty accidents, it is shown that drinking drivers have Unsafe Speed, Driving Without Due Care, Driving on Wrong Side of Road and Fell Asleep cited as contributing factors to casualty accidents more often than do sober drivers, while they have factors associated with their behaviour toward other drivers (e.g. Failure to Yield Right of Way, Following too Closely) cited less frequently than for sober drivers. This latter finding probably reflects the high (58.0%) frequency of single-vehicle accidents associated with alcohol, as noted in Chapter Six. Further, Driver Inexperience is cited less frequently as a contributing factor for drivers who were thought to have

been drinking than for those who were thought to be sober.

The finding noted in Section II that alcohol-related accidents do not seem to be associated with adverse environmental conditions (e.g. rain, fog, etc.) is supported by the finding in this section that conditions-related contributing factors are underrepresented in casualty accidents involving drivers who were thought to have been drinking. Further, not only can the drinking driver not pass off the responsibility for the accident on the driving conditions, that driver also cannot blame the vehicle condition, as the majority of vehicle-fault factors are underrepresented for drinking drivers in casualty accidents.

Thus, from the findings in Section III one obtains the strong impression that drinking drivers in casualty accidents are, as a group, both personally and socially irresponsible: they become physically impaired and drive by choice and thus show their irresponsibility and contempt for the law; once driving, they are both careless and tend to speed, again showing personal and social irresponsibility. Certainly, the effect of the consumed alcohol reduces their ability to drive, but it can be argued that it is not the alcohol per se that is the really primary contributing factor, but rather the irresponsible personality that chooses to drink and drive, to drive carelessly, and to speed. In short, the problem rests at least as much with the individual's personality as it does with effects directly attributable to the physiological influence of the alcohol consumed.

Further, with regard to the relationships among driver age, driver experience, and alcohol-related casualty accidents, Section III shows that:

1. More than any other factor examined driver age contributes most to the

likelihood of being in a casualty accident. That is, the younger the driver, the more probably the driver will be in a casualty accident:

2. The highest relative proportion of registered drivers in alcohol-related casualty accidents occurs in the 19-year old group, with this proportion decreasing for both younger and older drivers. As 19 years of age is the first time persons in B.C. can legally acquire alcohol, there may be a casual relationship between this legal access and alcohol-involved accidents;
3. For the 16-22 year old group of drivers, extent of driving experience did not relate systematically to being in an alcohol-related casualty accident.

From these findings one concludes that age alone is the best predictor of crash risks and that legal access to alcohol is the best predictor of alcohol-related crash risks, while years of driving experience do not related in any systematic fashion to alcohol-related crash risks.

Recommendations:

From Section 1 on the measurement of and trends in alcohol-related casualty traffic accidents, one can recommend that:

1) While public education programs such as CounterAttack are doing a fair job of keeping the problem of drinking drivers under control, and indeed work quite well during the "blitz" Winter times, more effort needs to be put into education and enforcement at peak alcohol-related accident time of early Spring and Summer; and
2) It would be worthwhile to broaden public education and enforcement campaigns to include speeding and failure to yield.

Broadly speaking, from Section II on the location and circumstances of these accidents, two recommendations can be taken:

1. Enforcement Resources and public education efforts need to be distributed in terms of the types of contributing factors associated with different locations. For example, it would make more sense to increase enforcement on Failure to Yield Right of Way (provincially cited in 16% of the accidents) in the Vancouver area (locally cited in 23% of the accidents) than to crack down on Following too Closely (provincially cited in only 7% of the accidents) in the Prince Rupert area (locally cited in only 3% of the accidents).
2. As it seems to be the driver not the circumstances that precipitates alcohol-related casualty accidents, then a focus on the driver and driver education would seem to be the route to take in order to reduce these accidents.

From Section III on the drivers, it seems reasonable to suggest that while further restricting access to alcohol would probably reduce alcohol-related accidents for that group affected, and would also probably marginally reduce the absolute number of accidents, a more effective approach to reducing young driver traffic accidents would involve limiting driving privileges for younger drivers. This would substantially reduce both alcohol-related and non-alcohol related accidents both for the age group affected and for the population generally, as age is the very best overall predictor of crash risks.

Finally, while there is much still needed to be done, it should be remembered that some few inroads have been made toward reducing alcohol-related casualty accidents in British Columbia. To place the

reduction of these accidents noted in Chapter Four into perspective, if one assumes that in each year from 1977 alcohol-related casualty accidents have been no more than 90% of the frequency that one might expect had there been no prevention programs, then one can calculate that between 1978 and 1982 inclusive, 146 deaths and 4,246 injuries have been avoided, which translates into a cost saving of about $43,920,000 to the Insurance Corporation of British Columbia alone, based on the I.C.B.C. cost estimate of $10,000 per injury or death.

CHAPTER ONE

INTRODUCTION: THE COSTS

There is little need to have to argue that drinking driving is a problem worth investigating: A glance at Table 1-1 on page 2 shows that in British Columbia in the last six and a half years, one thousand six hundred and thirty-one people have been killed and forty-six thousand, seven hundred and thirty-nine have been injured due to traffic accidents caused primarily by drinking drivers. Nonetheless, it might be useful to try to obtain some notion of the financial costs to the province associated with these traffic accidents.

Before discussing the average costs associated with alcohol-related traffic accidents in 1982 in British Columbia, it must be stressed that the figures presented herein are very rough approximations, gathered together to provide general notions of costs, and should not be considered authoritative in any manner. Indeed, what is desperately needed is a comprehensive study of traffic accident costs, rather than the informed guesswork presented herein.

However, with regard to the figures used to produce these estimations, one general principle was followed - to take a very conservative view of costs such that the final outcomes would be underestimations. For example, long-term care costs, loss of income costs, disability, welfare, lost productivity, and a number of other costs have not been included. There are two reasons for these exclusions: First, these costs are difficult to measure and, as noted above, this does not pretend to be a comprehensive study. Second, for real savings cost/benefit purposes, the notion was to

*The information on traffic accident costs was first presented in the CounterAttack study A Rough Estimation of the Average of Alcohol-Related Traffic Accidents in B.C., 1982, Ministry of Attorney General, January, 1984.

TABLE 1-1

PERSONS KILLED/INJURED IN ALCOHOL-RELATED TRAFFIC ACCIDENTS
B.C. JANUARY 1977 - JUNE 1983*

YEAR	PERSONS KILLED		PERSONS INJURED	
	NO ALCOHOL INVOLVED	ALCOHOL INVOLVED	NO ALCOHOL INVOLVED	ALCOHOL INVOLVED
1977	465 (67.6%)	223 (32.4%)	25,224 (82.2%)	5,480 (17.8%)
1978	400 (65.4%)	212 (34.6%)	26,658 (81.7%)	5,963 (18.3%)
1979	475 (64.5%)	262 (35.5%)	30,473 (80.4%)	7,437 (19.6%)
1980	505 (62.8%)	299 (37.2%)	32,831 (79.7%)	8,345 (20.3%)
1981	530 (61.8%)	328 (38.2%)	43,667 (82.2%)	9,452 (17.8%)
1982	385 (64.1%)	216 (35.9%)	26,696 (79.3%)	6,986 (20.7%)
1983 (6 mo)	180 (66.4%)	91 (33.6%)	11,891 (79.6%)	3,040 (20.3%)
PROV. TOTAL	2,940 (64.3%)	1,631 (35.7%)	197,440 (80.9%)	46,739 (19.1%)

*Data taken from Traffic Accident Report Form (MV104) using Contributing Factor #1 for Driver #1 to determine alcohol involvement. See Chapter 2.

restrict cost estimations to those directly and immediately associated with the accident that could be easily measured and accounted for within the fiscal year of the accident. That is, if the cost of programs can be argued to be beneficial when measured against these figures, then they are beneficial indeed.

While there is no question that drinking drivers cost society substantially in terms of both dollars and lives, it is difficult to assess the exact magnitude of these costs. Broadly, the costs of drinking driving accidents can be seen to stem from two partially overlapping sources - the cost of traffic accidents caused by the impaired driver and the costs to the criminal justice system for the apprehension, and prosecution and punishment of the impaired driver. Additionally, it should be noted that there are the relatively lesser costs of preventative public education and rehabilitative programs and the more substantial costs of long-term care, but for the purpose of this paper they will be ignored, as noted previously.

Traffic Accident Costs:

The Insurance Corporation of British Columbia[1] estimates that in 1982 about 483 million dollars were spent on the 118,147 moving vehicle accidents reported in that year[2], averaging about $4,100 per accident.

Beyond the costs covered by I.C.B.C., it is estimated that the Ministry of Health paid out a minimum of an additional 30 million dollars

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1 Personal Communication, L. Devito, Comptroller, Insurance Corporation of British Columbia, January, 1984.

2 It must be noted that, due to the slow economy reducing driving frequency, 1982 had fewer acidents than any of the past 5 years, and therefore these costs are below what one might expect in an average year.

on traffic accident victims in terms of hospital days, medical services, ambulances and extended care, working out to about $255 per accident[3]. If one were to make the not unreasonable assumption that about 20% of all traffic accidents are associated with drinking driving, then in 1982 alone drinking driving traffic accidents cost about 103 million dollars in damage and injury costs, or about $4,354 for each of the 23,629 accidents assumed to be associated with drinking driving.

Criminal Justice System Costs:

One unavoidable cost of drinking driving accidents to the Justice System involves the investigation of casualty accidents, and the average cost of one of these investigations to the police is about $80.00[4]. Assuming that 20% of the approximately 24,000 investigations carried out in 1982 was due to alcohol-related accidents then they cost the police about $19,200.

The additional costs of drinking drivers to the justice system are determined in part by the extent of the enforcement of driving while impaired legislation, which in turn varies due to both economic and policy pressures. However, assuming that about 23% of Driving While Impaired (DWI) charges stemmed from traffic accidents[5] then of the 20,141 DWI charges laid in 1982, about 4,632 DWI charges stemmed from accidents. Roughly speaking, an average Criminal Code case costs the police about

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3 Personal Communication with Mr. W. Lawrence, Research Director, Ministry of Health, December, 1983.

4 Personal Communication with Chief Insp. R. Rivers, "E" Division, R.C.M.P., December, 1983.

5 Mercer, G.W. Drivers, Charges, and Outcomes, Ministry of Attorney General, British Columbia, 1982.

$756, Courts about $160, the Judiciary about $48 and Crown Counsel about $29. Thus charges resulting from alcohol-related accidents cost about $1,445,500 in 1982. Further, in 1982 Driving While Impaired charges led to 3,920 persons going to jail at an average cost of $1,862 each and 1,843 persons being put on probation at an average cost of $475 each.[7] Again, assuming that 23% of these costs stemmed from drinking driving traffic accidents, then these accidents cost Corrections about $1,880,000 in 1982.

In sum, in 1982 DWI charges stemming from traffic acidents cost the Criminal Justice System about $3,325,500, or about $141 for each of the estimated 23,629 traffic accidents associated with drinking driving (i.e. 20% of all reported accidents, including property damage only accidents[8]).

In addition to the costs stemming from DWI charges, the costs of alcohol-related accident investigations must be added into the Justice System costs, bringing the total to $3,344,700 or aobut $141.55 per accident.

Overall Costs:

From the above, the average traffic accident associated with drinking driving costs about $4,496, with about 3% of this cost associated with the Justice System and 97% associated with property damage and injury costs, divided between I.C.B.C. at about 91% and the Ministry of Health at about 6%.

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6 Personal Communication, S/Sgt. Grant Tyndall, R.C.M.P. "E" Division, December, 1983.

7 Motor Vehicle Task Force Report, Ministry of Attorney General, 1983.

8 Another way of looking at this is that it costs about $718 per DWI charge laid in terms of costs to the police, Courts, Judiciary, Crown and Corrections.

On the other hand, it might be argued that the entire costs of Driving While Impaired charges ought to be calculated into the costs of alcohol-related accidents, as opposed to only the costs of those charges stemming from these accidents. The rationale for this would be that the latent purpose of DWI laws and charges is the reduction of accidents, and therefore the entire costs associated with DWI enforcement ought to be included in the calculation. If one were to do this, it would raise the cost of the average alcohol-related traffic accident to about $4,967 with the Justice System carrying about 12% of that cost, I.C.B.C. carrying about 83% and the Ministry of Health carrying about 5%.

Nonetheless, whether the figure is 97% or only 88%, clearly the burden of the cost of alcohol-related accidents is on the property damage and injury side, as opposed to on the Justice System side. That is, the cost of law enforcement associated with Driving While Impaired is a very small fraction of the total costs of accidents associated with drinking driving. Further, should the costs not included in this report (e.g. lost wages, long-term benefits etc.) be added, the Justice System proportion would be even smaller.

Inasmuch as 1) there are only two components to the cost of alcohol-related accidents (i.e. accident component and enforcement component) and 2) the level of DWI enforcement does affect the frequency of alcohol-related accident rates,[9] while improved medical benefits obviously cannot reduce accidents, then 3) the inevitable conclusion one comes to is that prevention through enforcement is a relatively inexpensive

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9 Mercer, G.W., Trends in Alcohol-Related Casualty Traffic Accidents in British Columbia, January, 1977 - May, 1983. Ministry of Attorney General, December, 1983.

way to reduce the cost of alcohol related traffic accidents. For example, if there were an increase in enforcement such that 50% more people were charged with Driving While Impaired, and that resulted in only a 10% reduction in alcohol-related acidents, overall the Province would save the equivalent of about 6 million 1982 dollars, and that figure assumes that all Justice System costs associated with DWI are charged against accident costs.

A second observation can be drawn from these calculations: currently the Ministry of Attorney General contributes 50% of the budget directed exclusively toward preventing alcohol-related traffic accidents (i.e. CounterAttack), yet the Justice System is the component least likely to gain in any reduction of these accidents. Further, CounterAttack's budget of $600,000 per annum represents about one half of one percent of the estimated cost of these accidents.

Finally, it can be argued that drinking driving still causes more harm to and extracts more costs from society than does any other single behaviour. For example, in 1982 30% of the persons charged by the police under the Canadian Criminal Code, 30% of the completed Criminal Code cases and 34% of the admissions to Corrections institutions were Driving While Impaired charge related.

The Purpose and Structure of This Document:

In an effort to understand the problem of drinking driving, CounterAttack research has previously examined the general characteristics of drinking drivers in B.C.[10] as well as the characteristics of drinking

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10 Mercer, G.W., The Characteristics of Night-Time Drivers in British Columbia, Ministry of Attorney General, December, 1982.

drivers who were apprehended and charged in B.C.[11] and the outcomes of these charges. (See Appendix A and Appendix B for summaries of this research.) The purpose of this research report is to examine the characteristics of traffic accidents causing injury and/or death (i.e. casualty accidents) that were associated with drinking drivers in order to gain insight into the traffic accident aspect of this multi-faceted problem.

More specifically, casualty accidents are examined in terms of: their immediate causes and problems in the reporting of the immediate causes; Province-wide geographical locations of casualty accidents caused by these contributing factors; the situational characteristics of alcohol-related casualty accidents (e.g. time of day, day of week, month of year, characteristics of the location and so on), the additional casual factors associated with alcohol-related casualty accidents such as speeding; and finally how driver age and experience relates to these accidents. Each of the topics noted above comprises a largely self-contained chapter in this research report, and was originally a separate CounterAttack Brief Report, produced in 1983 and distributed on a limited basis.[12]

Although each of chapters three through eight originated as a stand-alone report, there is an internal logic to their order and

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11 Mercer, G.W., Driving While Impaired: Drivers, Charges and Outcomes, Ministry ofAttorney General, February, 1983.

12 The information produced in this report supercedes information presented in CounterAttack Brief Reports 3-11. However, it should be noted that while this report differs somewhat from the Brief Reports in terms of the occasional figure or sentence, the general conclusions found herein in no way differ from those in the earlier Brief Reports.

organization. Initially, Section I deals with the necessarily primary question of the problems associated with the measurement of the phenomena: Chapter Two and especially Three consider the most effective way to measure the contribution of alcohol to traffic accidents, within the context of the contribution of other driver-related factors, environment-related factors and vehicle-related factors. Chapter Four continues to consider the measurement problems surrounding the assessment of factors contributing to traffic accidents, but does so from the perspective of measuring trends in data that are systematically biased over time. In addition, this chapter speaks to the possible effects of the CounterAttack program.

Having defined the frame and terms of reference in Section I, this report then looks at the geographic locations and circumstances of traffic accidents in Section II: Chapter Five defines locations in terms of police reporting districts throughout the province and examines the proportions of the most frequently cited contributing factors to casualty accidents within each geographical location, while Chapter Six considers a number of situational circumstances that distinguish alcohol-related casualty accidents from those not related to drinking driving.

Moving from the general geographic and situational characteristics of casualty traffic accidents presented in Section II, Section III focuses in on some of the characteristics of the drivers in these accidents. In particular, in Chapter Seven, sober drivers in casualty accidents are compared to drinking drivers in casualty accidents in order to determine what factors contributing to the accident other than alcohol discriminate between these two groups. Chapter Eight continues the examination of the driver, but instead considers how the drivers' age and driving experience

affect the likelihood of being in an alcohol-related casualty traffic accident.

Finally, Section IV attempts to bring together a picture of drinking driving and drinking drivers in British Columbia.

SECTION I

MEASUREMENT AND TRENDS

*Primary Data Source
*Most Frequently Cited Contributing Factors
*Trends

CHAPTER TWO

PRIMARY DATA SOURCE

Accident reports are compiled and put into a computer-readable form by the Ministry of Transportation and Highways, and from this, a wide variety of analyses can be done.[1] The subset of accidents that this report deals with is that set of accidents involving injury and/or death (i.e. casualty accidents). The reason for limiting the sample to this group is twofold: First, it would be very costly in terms of computer time to deal with all reported accidents - for example, in B.C. in 1982 there were 118,147 reported accidents, but only 24,220 accidents (20.5%) involved injury or death. Second, many accidents not involving injury or death are reported by drivers to the police some time after the accident, whereas those involving injury or death are usually attended by police who also fill out the Accident Report Forms (MV104). Therefore, the data from reports completed by the police are likely to be the most valid and reliable.

Finally, while some research on traffic accidents is limited to only those accidents resulting in deaths, this research is based on accidents involving injury and/or death. The reason for this is that very often the difference between a accident involving injury and one involving death is, in terms of the physics of the accident, minimal - a matter of a few kilometers an hour difference in speed or a few centimeters difference in the location of the impact. Therefore, by combining injury-related and death-related

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[1] It should be noted here that information on accidents is constantly being revised and improved by the Motor Vehicle Department. It follows that the figures drawn from one set of data may differ from figures drawn from an updated set, and therefore any figures produced by the M.V.D. after the creation of this data set (August, 1983) which contradict these figures should be considered correct.

accidents into one group, the research can be based on a sample of accidents at least forty times greater than the number of death-related accidents and thus one can have considerably more confidence in the reliability of the results of the research.

Therefore, the majority of information in this publication comes from computer-based analyses of casualty accidents as reported on the Traffic Accident Report Form (MV104). Please see Appendix C for a copy of the template to this form.

CHAPTER THREE

THE MOST FREQUENTLY CITED CONTRIBUTING FACTORS TO CASUALTY TRAFFIC ACCIDENTS, B.C. 1982*

Each driver/vehicle combination in a traffic accident brings to that accident factors which, in combination with the physical conditions found at the accident site, produces the accident. Sometimes the primary or most important contributing factor to the accident for the driver/vehicle combination involves driver condition or error, sometimes it is the condition of the vehicle, and sometimes it is the environmental conditions found at the accident site.

Some of the contributing factors to traffic accidents are well documented and clearly perceived by the general public, the police, and the courts. The role of alcohol in accidents comes easily to mind as a contributing factor that society has recognized and responded to with such measures as public information programs (e.g. CounterAttack), enforcement programs (e.g. spot-checks, mobile breathalyzer vehicles) and severe criminal sanctions (Criminal Code sections 234, 235, 236 see Appendix D). However, the role of alcohol in traffic accidents, while substantial, does not account for the cause of the majority of accidents. Indeed, there may well be factors which, though not publically recognized as such, contribute as substantially as alcohol to these accidents.

It follows that the entire range of factors contributing to traffic accidents needs to be both clearly defined and, where possible, responded to in terms of public awareness campaigns, enforcement programs, and criminal sanctions. Therefore, it is the purpose of this chapter to document and comment upon the driver/vehicle/conditions factors contributing to

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* The information presented in this chapter comes from the CounterAttack Brief Report #4, Ministry of Attorney General, May, 1983.

accidents within the context of the 1982 B.C. data on accidents involving injury or death as recorded on the Accident Report Form (MV104).

ANALYSES

From the B.C. 1982 MV104 reports involving injury and/or death the primary contributing factor codes (i.e. Apparent Contributing Factor #1) were compiled for each driver/vehicle entity. These codes were then examined within the context of each of driver factors, vehicle factors and conditions factors, as well as within the larger context of how each individual factor contributed to the entire sum of primary contributing factors.

In addition, the dozen most frequently cited contributing factors were also examined in terms of their frequency of citation as <u>any</u> contributing factor. That is, the contribution of each was calculated by summing the number of citations as first, second, or third contributing factor associated with the driver/vehicle combination. The reasoning here is that, while the primary contributing factor is considered the most important contributing factor, one can argue that it is sometimes difficult to unequivocally assign primacy to one particular factor, and therefore in order to gain perspective on the frequency of the factors contributing to accidents, one ought to assess the contribution of these factors entire, whether as primary, secondary or tertiary contributors.

RESULTS

<u>Contributing Factor #1</u>:

Table 1-3 on page 15 illustrates the primary contributing factors for each driver/vehicle entity (as drawn from the B.C. 1982 MV104 forms for

TABLE 1-3

DRIVER/VEHICLE CONTRIBUTING FACTORS

CONTRIBUTING FACTOR #1	TOTAL DRIVER/VEHICLE	% DRIVER/VEHICLE
Driver Fault	17,241	42.2
Conditions Fault	3,031	7.4
Vehicle Fault	626	1.5
Does Not Apply	18,381	45.0
Missing Data	1,563	3.8
TOTAL	40,842	100.0%

casualty accidents), grouped in terms of the broad categories of driver fault, conditions fault and vehicle fault. In addition, Table 1-3 also shows the proportion of "does not apply" codes and missing data codes.

From this table one can see that for the plurality of driver/vehicle combinations, the "does not apply" code was used (45.0%). This code indicates that, in the opinion of the officer at the scene, no apparent contributing factors could be ascribed to that particular driver/vehicle entity in the accident. Turning to those cases where contributing factors could be ascribed, the table shows that for the majority of driver/vehicle combinations, driver fault was considered as the primary contributing factor (42.2%), while conditions accounted for 7.4% and the vehicle for 1.5%. Missing data comprised 3.8%.

Tables 2-3 through 4-3 (pages 17, 18, 19) break each of the broad driver, conditions and vehicle factors down into their component codes.

Considering the driver-associated factors found in Table 2-3, Alcohol Involvement was the most frequently cited primary contributing factor, comprising 10.0% of the total number of driver/vehicle combinations and 23.6% of the driver factor. The next most frequently cited driver factor was Driving Without Due Care at 8.6% of the total and 20.4% of the category, followed by Failure to Yield the Right of Way at 7.3% of the total and 17.3% of the category. The driver-related primary contributory factors cited for between 1% and 5% of the cases were, in order: Unsafe Speed (3.8%), Following too Closely (3.0%), Traffic Control Device Ignored - for example running a red light or stop sign - (2.0%) and Driver Inexperience (1.8%). Those driver-related factors comprising between 0.5% and 1.0% of the driver/vehicle total were: Driving on the Wrong Side of the Road (0.9%), Pedestrian Error (0.9%), Turning Improper (0.9%), Improper

TABLE 2-3

BREAKDOWN OF DRIVER FACTOR CATEGORIES

CONTRIBUTING FACTOR #1	# DRIVER/ VEHICLE	% DRIVERS' FAULT CATEGORY	% TOTAL DRIVER/ VEHICLE
Alcohol Involvement	4,079	23.6	10.0
Driving Without Due Care	3,521	20.4	8.6
Failure to Yield Right of Way	2,989	17.3	7.3
Unsafe Speed	1,545	9.0	3.8
Following Too Closely	1,238	7.2	3.0
Traffic Control Device Ignored	825	4.8	2.0
Driver Inexperience	755	4.4	1.8
Driving on Wrong Side of Road	371	2.2	0.9
Pedestrian Error/Confusion	351	2.0	0.9
Turning Improper	349	2.0	0.9
Improper Passing	254	1.5	0.6
Fell Asleep	227	1.3	0.6
Cutting In	217	1.3	0.5
Backing Unsafely	202	1.2	0.5
Extreme Fatigue	100	0.6	0.2
Failure to Signal	56	0.3	0.1
Sudden Loss of Consciousness	52	0.3	0.1
Illness	44	0.3	0.1
Pre-existing Physical Disability	24	0.1	0.1
Suicide	14	0.1	0.0
Drugs (Illegal)	12	0.1	0.0
Officer/Flagman/Guard Ignored	11	0.1	0.0
Prescribed Medication	5	0.0	0.0
TOTAL	17,241	100.0%	42.2%

TABLE 3-3

BREAKDOWN OF CONDITIONS FACTOR CATEGORIES

CONTRIBUTING FACTOR # 1	# DRIVER/ VEHICLE	% CONDITIONS CATEGORY	% TOTAL DRIVER/ VEHICLE
Weather	1,653	54.5	4.0
Visibility Impaired	362	11.9	0.9
Wild Animal	259	8.5	0.6
Obstruction/Debris on Road	219	7.2	0.5
Tame Animal	146	4.8	0.4
Road Maintenance/Construction	115	3.8	0.3
Previous Traffic Incident	81	2.7	0.2
Pavement Defective	76	2.5	0.2
Glare-Sun	67	2.2	0.2
Glare-Artificial	45	1.5	0.1
Sign Obstruction	8	0.3	0.0
TOTAL	3,031	100.0%	7.7%

TABLE 4-3

BREAKDOWN OF VEHICLE FACTOR CATEGORIES

CONTRIBUTING FACTOR #1	# DRIVER/ VEHICLE	% VEHICLE CATEGORY	% TOTAL DRIVER CATEGORY
Brakes Defective	173	27.6	0.4
Tires Failure - Inadequate	134	21.4	0.3
Steering Failure	69	11.0	0.2
Headlights Defective/Out	53	8.5	0.1
Driverless	46	7.3	0.1
Engine Failure	45	7.2	0.1
Accelerator Defective	30	4.8	0.1
Brake Lights Out	21	3.4	0.0
Turn Signals Defective	19	3.0	0.0
Tow Hitch Failure	11	1.8	0.0
Suspension Defective	7	1.1	0.0
Restraint System	7	1.1	0.0
Vehicle Modification	5	0.8	0.0
Windshield Defective	3	0.5	0.0
Oversize Vehicle	3	0.5	0.0
TOTAL	626	100.0%	1.5%

Passing (0.6%), Fell Asleep (0.6%), Backing Unsafely (0.5%) and Cutting In (0.5%). The remaining driver-related factors each comprised less than 0.5% of the driver/vehicle total.

Regarding conditions-related codes, Weather was most frequently cited (4.0% of driver/vehicle total), followed at some distance by Visibility Impaired (0.9%), Wild Animal (0.6%) and Obstruction/Debris on Road (0.5%). The remaining conditions-related factors accounted for less than 0.5% of the overall driver/vehicle total.

All of the codes in the vehicle-related factors each comprised less than 0.5% of the driver/vehicle total. The three most often cited were Brakes Defective (0.4%), Tires Failure - Inadequate (0.3%) and Steering Failure (0.2%).

Twelve Most Frequently Cited Factors:

Table 5-3 on page 21 displays the twelve most frequently cited contributing factors associated with the driver/vehicle entity when assessed in terms of being cited at any level - primary, secondary or tertiary.

It is noteworthy that the relative hierarchy of the factors changes when each is considered from any level of contribution as opposed to from the primary level only. The changes in the ordering of citation frequency when comparing the factors in primary vs undifferentiated criteron are as follows: Alcohol Involvement, which was the most cited contributor (10% of the instances) as primary contributing factor increased to 11.5% of the instances when considered at all levels of contribution. However, Alcohol Involvement was replaced as most cited factor by Driving Without Due Care, which increased from 8.6% of the citations as primary factor to 16.2% as contributor at any level.

Failure to Yield Right of Way was third most cited primary

TABLE 5-3

TWELVE MOST FREQUENTLY CITED CONTRIBUTING FACTORS

CONTRIBUTING FACTOR	AS CONTRIBUTING FACTOR # 1		AS ANY CONTRIBUTING FACTOR		% CITED AS SECONDARY OR TERTIARY FACTOR*
	# DRIVER/ VEHICLE	% TOTAL	# DRIVER/ VEHICLE	% TOTAL	
Driving Without Due Care	3,521	8.6	6,615	16.2	46.8
Alcohol Involvement	4,079	10.0	4,714	11.5	13.5
Unsafe Speed	1,545	3.8	4,086	10.0	62.2
Failure to Yield Right of Way	2,989	7.3	3,913	9.6	23.6
Weather	1,653	4.0	3,233	7.9	48.9
Following Too Closely	1,238	3.0	1,749	4.3	29.2
Driver Inexperience	755	1.8	1,478	3.6	48.9
Traffic Control Device Ignored	825	2.0	1,423	3.5	42.0
Driving on Wrong Side of Road	371	0.9	801	2.0	53.7
Turning Improper	349	0.9	718	1.8	51.4
Improper Passing	254	0.6	461	1.1	44.9
Pedestrian Error/Confusion	351	0.9	457	1.1	23.2

*NOTE: EXPECTED % CITATION AS SECONDARY OR TERTIARY SUMMED = 38%

contributory factor (7.3% of the instances) and increased to 9.6% of the instances when assessed at all contribution levels. However it was replaced as third most cited factor by Unsafe Speed, which increased from a citation frequency of 3.8% as primary contributor to 10.0% as any contributory factor.

Pedestrian Error/Confusion dropped from tenth most cited factor when considered as primary factor to eleventh most cited when considered at all contribution levels. It was replaced by Turning Improper which increased from a 0.9% citation frequency as primary contributor to 1.8% as contributor at any level.

In sum, looking at the contributing factors in terms of their citation at any level, the dozen most frequently cited are: Driving Without Due Care (16.2%), Alcohol Involvement (11.5%), Unsafe Speed (10.0%), Failure to Yield Right of Way (9.6%), Weather (7.9%), Following too Closely (4.3%), Driver Inexperience (3.6%), Traffic Control Device Ignored (3.5%), Driving on Wrong Side of Road (2.0%), Turning Improper (1.8%), Improper Passing (1.1%), and Pedestrian Error/Confusion (1.1%).

Reporting Problems:

The difference between the frequency of citation as primary contributor and as any level contributor warrant attention as they shed light on reporting techniques and tendencies. The far right column of Table 5-3 illustrates the proportion of times a factor is noted as secondary or tertiary as a function of its frequency of citation overall. For example, if a factor was cited about the same number of times as a secondary and as a tertiary factor as it was as a primary factor it would be cited 66.6% of the time as either secondary or tertiary factors. However, in this sample, secondary factors are recorded for only about 24% (N=9,641) of the driver/vehicle combinations, and tertiary factors are

cited in only about 9% (N=3,534) of the instances. Therefore the likelihood of a factor being cited an equal number of times as primary, secondary and tertiary contributor is very small indeed. In fact, the expected percent of times a factor will be cited as secondary or tertiary in sum is not 66% (as it would be if all three levels of contribution were universally completed) but is rather about 38%.

Using this expected figure of 38%, one can argue that all things being equal, factors that one cited less than 38% of the time as either secondary or tertiary factors are being overrepresented as primary factors, unlike those factors cited more often than 38% as secondary or tertiary factors are underrepresented as primary factors. From this one notes that Alcohol Involvement and Pedestrian Error are substantially overrepresented as primary factors, while Unsafe Speed and Driving on Wrong Side of Road are substantially underrepresented as primary factors. Indeed, if one were to weight the primary factor citation frequency of each of the 12 factors to what one might expect with no reporting biases, one finds the primary contributing factor percent citation to be as follows:[1]

Calculated Primary Factor	Expected % of Total Primary Factor
Driving Without Due Care	10.0
Alcohol Involvement	7.2
Unsafe Speed	6.2
Failure to Yield Right of Way	5.9
Weather	4.9
Following Too Closely	2.7
Driver Inexperience	2.2
Traffic Control Device Ignored	2.2
Driving on Wrong Side of Road	1.2
Turning Improper	1.1
Improper Passing	0.7
Pedestrian Error/Confusion	0.7

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1 This calculation is done simply by taking 62% of the total number of citations for each factor and calculating that number as a percent of the total number of driver/vehicle entities. Sixty-two percent is the expected proportion of primary factor citations.

By comparing the above expected primary factor citation frequency with the actual primary factor citation frequency (Table 5), one can see that the expected frequencies differ from the actual frequencies. Further, the relative ordering for the expected primary factors parallels exactly the overall total citation frequency ordering.

DISCUSSION

Reporting Problems:

Information recorded on the Traffic Accident Report Form (MV104) is the best source of epidemiological information on traffic accidents in British Columbia and possibly the most reliable source in Canada. Unfortunately, while the forms are designed to capture a broad range of information related to the accident, circumstances, driver, vehicle, victims and so on, they are not always completed as thoroughly as to optimize their usefulness. This problem is particularly severe in the Contributing Factors codes.

The Contributing Factors codes allow up to three factors to be recorded for each driver/vehicle entity involved in the accident, and these codes are arranged in order of importance - primary, secondary and tertiary Contributing Factors. The codes themselves range from very specific categories such as Defective Brakes, Debris on Road, or Following too Closely (all easily determined) to broad categories such as Weather, Alcohol Involvement, or Driving Without Due Care (the latter being almost a tautology in an accident). By selecting from these various factors, the person completing the Traffic Accident Report Form can therefore attribute a wide range of contributing factors to the accident and thus produce a description of the contributing factors that includes general impressions as well as specific behaviour.

However, as witnessed by these analyses, there is a strong tendency to report no particular contributing factors (e.g. Does Not Apply - 45%) or to report only one or at best two factors - in only 8% of the cases were tertiary factors reported. Further, when attributing these factors there is a very great likelihood that general and easily determined rather than specific contributing factors will be reported. The best examples to illustrate this point are Alcohol Involvement and Driving Without Due Care. On the former, while indicating Alcohol Involvement is a critical piece of information that certainly ought to be recorded, if that is the only factor recorded, then one does not know what the driver did, what actual behaviour contributed to the accident. On the latter, Driving Without Due Care is not only not a specific description of behaviour, it is almost a given truth that, if one were driving with due care, the accident would not have occurred. In short, the point is not that these factors should not be cited, but that when they are cited to the exclusion of more specific behavioural descriptions, they lose much of their worth.

Associated with the problem of too few of the Contributing Factor codes being completed is the tendency not only for general contributors to be chosen, but for these general factors to be scored as the only and primary factor. (This problem is particularly serious with Alcohol Involvement, as witnessed by its gross overrepresentation as primary factor.)

In turn, these reporting problems are further complicated by the all too common practice of limiting accident report analyses to an assessment of Primary Contributing Factors only. That is, given the bias to overreporting general factors as primary contributors, much valuable information on a specific factors is lost by only assessing primary factors.

Contributing Factors:

Given the problems with the data noted above, clearly the Driver Fault group of factors is the most cited as primary contributors, the Conditions Fault group as next most frequently cited, and the Vehicle Fault Group least cited.

When considering the twelve most cited factors (which account for 85.7% of the total number of primary factor citations), one finds that the relative frequency of citation differs when comparing primary factor citation frequency with citation frequency at any level: for example, Alcohol Involvement is replaced by Driving Without Due Care as most frequently cited factor; Unsafe Speed replaces Failure to Yield Right of Way as third most frequently cited factor; Weather moves from fourth most cited to fifth and so on. As noted previously, it is probable that assessing Contributing Factors in terms of any citation as opposed to primary citation gives a more accurate assessment of the factor's contribution. Nonetheless, whichever way these data are examined one can easily see that four factors are all very frequently cited and that each is cited, for all pratical purposes, as frequently as the others: Driving Without Due Care, Alcohol Involvement, Unsafe Speed, and Failure to Yield Right of Way. That is, Failure to Yield Right of Way, Driving Without Due Care and Unsafe Speed are all as important as Alcohol Involvement in terms of contributing to accidents. However, while the sanctions for drinking and driving are, quite justifiably, severe and involve loss of driving privileges, fines and jail terms, the sanctions for Driving Without Due Care, Failing to Yield Right of Way and Unsafe Speed are relatively trivial. Further, the dangers of drinking and driving are well publicized

while the equally serious dangers of failing to yield the right of way are, one could argue, not in the public's awareness at all.

Certainly, the argument here is not to reduce sanctions or public campaigns against drinking and driving, but rather is to increase sanctions and public awareness of accident factors that are at least as serious as drinking and driving.

More broadly, contributing factors can be divided into factors that are easily affected by social policy, justice system policy and legislation, factors that can be influenced but only with difficulty by social policy, justice system policy and legislation, and factors that cannot be influenced by social policy, justice system policy and legislation. For example driving at unsafe speeds might be influenced through an increase in penalties for speeding and an increase in the use of speed detection devices such as radar - thus the problem is attacked in a relatively straightforward manner. Driving Without Due Care, on the other hand, is perhaps less easily detected and defined, and may have much to do with general attitudes about driving - a situation that can only be attacked through indirect means such as driver education directed at making drivers more cautious. Finally, contributing factors such as Weather or Wild Animal pose problems that are not likely to be easily affected by legislation or policy. Fortunately, the majority of instances cited involve contributing factors that are easily defined, easily detected, and could be affected by policy and/or legislation.

It is beyond the scope of this paper to attempt to detail the ways and means each contributing factor could be affected, as they could range from major changes in legislation through to the particular aspects of vehicles that need to be frequently checked. Further, these ways and means stretch

across ministries and the private sector. Nonetheless, the first step - the assessment and ordering of contributing factors - has been taken. It is up to the various policy makers and educators concerned with traffic safety to take the next.

RECOMMENDATIONS

It is recommended that:

1. Accident Report Form (MV104) be completed more thoroughly on Contributing Factor codes. In addition, an attempt should be made to include both general (e.g. Driving Without Due Care) and specific (e.g. Unsafe Speed) contributors.
2. Analyses of Contributing Factor codes be done in terms of any level of contribution as opposed to only primary level.
3. There be a more extensive consideration of the entire range of contributing factors among the government and private sector agencies concerned with traffic safety. In particular, failure to yield, speeding, and general driving concentration are areas that are severely in need of attention.

CHAPTER FOUR

TRENDS IN ALCOHOL-RELATED CASUALTY TRAFFIC ACCIDENTS IN BRITISH COLUMBIA JANUARY 1977 - MAY 1983*

In 1977 The Ministry of Attorney General of British Columbia and the Insurance Corporation of British Columbia initiated the CounterAttack program in an attempt to reduce drinking driving and the casualties associated with same. Since that time CounterAttack has: encouraged local anti drinking-driving campaigns; produced and distributed educational materials, displays and mass media messages; sponsored and coordinated mobile breath alcohol testing vehicles (BATmobiles); researched the problem of drinking and driving; made recommendations to the government concerning drinking driving legislation; and cooperated with the police, other Ministries, Crown Corporations, other levels of government and private sector groups interested in reducing drinking driving. These efforts, along with the efforts of many other groups, have raised the issue of drinking driving to such a level of importance that in 1983, it was targeted as a public priority by the British Columbia Medical Association, the British Columbia government, the Canadian governments, Federal and Provincial, in their Throne Speeches, and by the United States government in a Presidential Task Force report. Clearly, the North American public consider drinking driving as a real concern worthy of attention and action.

However, while CounterAttack has undoubtedly contributed to raising the public's awareness of the problems caused by drinking drivers and to making drinking driving into an issue that people are currently eager to pursue in terms of new programs and legislative changes, the question arises as to its effect on drinking driving since 1977. Unfortunately,

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* The information presented in this chapter comes from the CounterAttack Brief Report #11, Ministry of Attorney General, December, 1983.

that is a very difficult question to answer, largely due to technical measurement problems.

Ideally, surveys throughout the province that actually stopped drivers at selected times and places and obtained breath samples should have been carried out every few months in order to determine the effects of the CounterAttack program. In fact, one such survey was conducted in the Spring of 1981, and, when compared to a less sophisticated, less elaborate and less extensive survey conducted in 1974,[1] found no real differences in drivers' blood alcohol levels in the Lower Mainland area. On the other hand, to be useful such surveys would need to be done much more often, and at a cost of between $50,000 - $100,000 each, are well beyond the scope of the CounterAttack budget.

A second approach to measuring levels of drinking driving is to infer those levels from the proportion (i.e. percent) of drivers killed who had been drinking. Unfortunately, such medical tests on deceased drivers have not ben made often and consistently enough since 1977 to be able to obtain such data.

Another approach that is sometimes used is to examine from year to year the actual number of deaths and/or injuries attributable to alcohol-related traffic accidents. This approach has two flaws - the first has to do with how to attribute accidents to alcohol when insufficient driver testing is done, as noted above, and the second flaw has to do with the fact that the number of accidents in any given year will vary in terms of the number of miles driven, trips taken and so on, and this in turn varies with the state of the economy.[2]

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1 Mercer, G.W. The Characteristics of Night-Time Drivers in British Columbia, Ministry of Attorney General, British Columbia, 1982.

2 Cooper, P.J. The Nature and Causes of the 1982 Traffic Accident Reductions in B.C., Insurance Corporation of British Columbia, 1983.

It follows that what is needed to assess changes in drinking driving from 1977 to date would be a measure that: 1) has been used consistently from 1977; 2) assess drivers' alcohol use every time it is used and; 3) does not draw additionally on the budget. Fortunately, through the Motor Vehicle Branch of the Ministry of Transportation and Highways, CounterAttack has access to such a measure - the Traffic Accident Report Form (MV104) completed by the police at every casualty accident since 1977[3] that assesses the factors contributing to the accident, including an assessment of the drivers' alcohol use. From a computer analysis of these forms, the monthly percentage of alcohol-related casualty accidents can be calculated, and from comparing month to month one can get some notion of changes in the percent of drivers who are drinking.

Therefore, it is the purpose of this chapter to try to determine levels of drinking driving in British Columbia from 1977-1983 through an examination of the contributing factors noted on the MV104 for casualty accidents. In addition, this chapter will discuss the effectiveness of the CounterAttack program through an examination of both these trends and trends in Driving While Impaired charges as drawn from the Statistics Canada Uniform Crime Report data.

ANALYSES

All reported (MV104) casualty traffic accidents involving injury or death in B.C. from January 1977 to May 1983 were examined in terms of the six generally most frequently cited contributing factors in order to determine trends in these factors, especially the factor of Alcohol

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3 Unfortunately, the MV104 forms prior to 1977 differ from the post 1977 forms to a sufficient degree that pre-1977 data cannot be used in conjunction with post-1977 data.

Involvement Specifically, the factors considered were: Driving Without Due Care, Alcohol Involvement, Unsafe Speed, Failure to Yield Right of Way, Weather and Following too Closely (tailgating).

After examining all levels of contributing factors (primary, secondary, tertiary), it was discovered that due to the changes in the Traffic Accident Report Form (MV104) that were implemented in 1977, there were irregularities in the number of levels of contributing factors that were reported, with fewer levels being reported at the beginning of the time period under consideration than at the end. This inconsistency produced a situation where any given contributing factor would have more of a chance of being cited for the accident when the Report was completely filled out than when it was only partially completed, thus making it impossible to reliably compare assessments of all contributing factors to each accident from year to year. Therefore, it was decided to examine only the primary contributing factors for Driver #1 in each accident report, as that category was consistently completed.

Further, upon examining only factor #1, Driver #1, it was discovered that, for 1977 only, the factor "Weather" was practically never cited, causing an inflation in the proportion of other factors cited as the primary contributor to the accident. Thus, the proportion of times each contributing factor was cited was re-calculated after removing all accidents where Weather ws cited as factor #1 for Driver #1. This has the dual effect of both removing the 1977 bias in the data cased by underreporting Weather, and of limiting the analyses to human, as opposed to environmental, factors.

Additionally, the absolute number of accidents clearly attributable to alcohol (i.e. alcohol cited as primary Contributing Factor for Driver #1)

and the number of Driving While Impaired charges laid between 1977-1983 (taken from Uniform Crime Report data) were examined in order to determine the relationship, if any, between alcohol-related accident rates and the likelihood of apprehension for Driving While Impaired.

RESULTS

Figure 1-4 on page 34 illustrate the trends for the citation as primary contributing factor causing casualty accidents, for: Driving Without Due Care, Alcohol Involvement, Unsafe Speed, Failure to Yield the Right of Way, Weather and Following too Closely from January 1977 to May 1983. Figure 2-4 on page 35 is similar to Figure 1-4, except that the effect of Weather as a contributing factor has been removed for reasons explained in the Analyses section of the METHOD. Figure 3-4 on page 37 plots the line of the number (as opposed to proportion) of casualty accidents attributable to alcohol against the number of Driving While Impaired charges laid from January 1977-December 1982. (The 1983 charge data was not available at the time of writing).

Figure 1-4 shows the effect of Weather not being reported often in 1977 on inflating the proportion of other factors cited, as well as the strong seasonal effect of that variable on other variables throughout the reported years. Clearly, the effects of Weather needed to be removed when considering human factors, as was done in Figure 2-4.

From Figure 2-4 it can be seen that the five contributing factors plotted all follow seasonal variations. Driving Without Due Care and Alcohol Involvement parallel each other, while Alcohol Involvement is cited least often in the December-January periods, and most often in the Spring. Overall, the proportion of reference to alcohol as the primary Contributing

FIGURE 1 -4

CASUALTY TRAFFIC ACCIDENTS, JANUARY 1977- MAY 1983, BRITISH COLUMBIA:
PERCENT ASSOCIATED WITH FREQUENTLY CITED CONTRIBUTING FACTORS- DRIVER 1, FACTOR 1 ONLY.

YEAR	YEARLY AVERAGES					
	WITHOUT CARE	ALCOHOL INVOLVED	SPEEDING	NOT YIELD	WEATHER	TAIL-GATING
1977	17.0%	19.3%	10.7%	12.7%	0.6%	6.6%
1978	14.6%	16.6%	7.8%	11.2%	4.2%	4.7%
1979	14.8%	14.3%	5.5%	9.6%	4.4%	3.9%
1980	15.0%	14.7%	5.4%	10.2%	4.3%	4.0%
1981	15.6%	15.3%	5.2%	9.8%	3.9%	3.6%
1982	14.7%	15.0%	5.3%	9.8%	5.3%	3.4%
1983	15.0%	14.9%	4.9%	10.5%	3.7%	3.4%

DRINKING DRIVING COUNTERATTACK

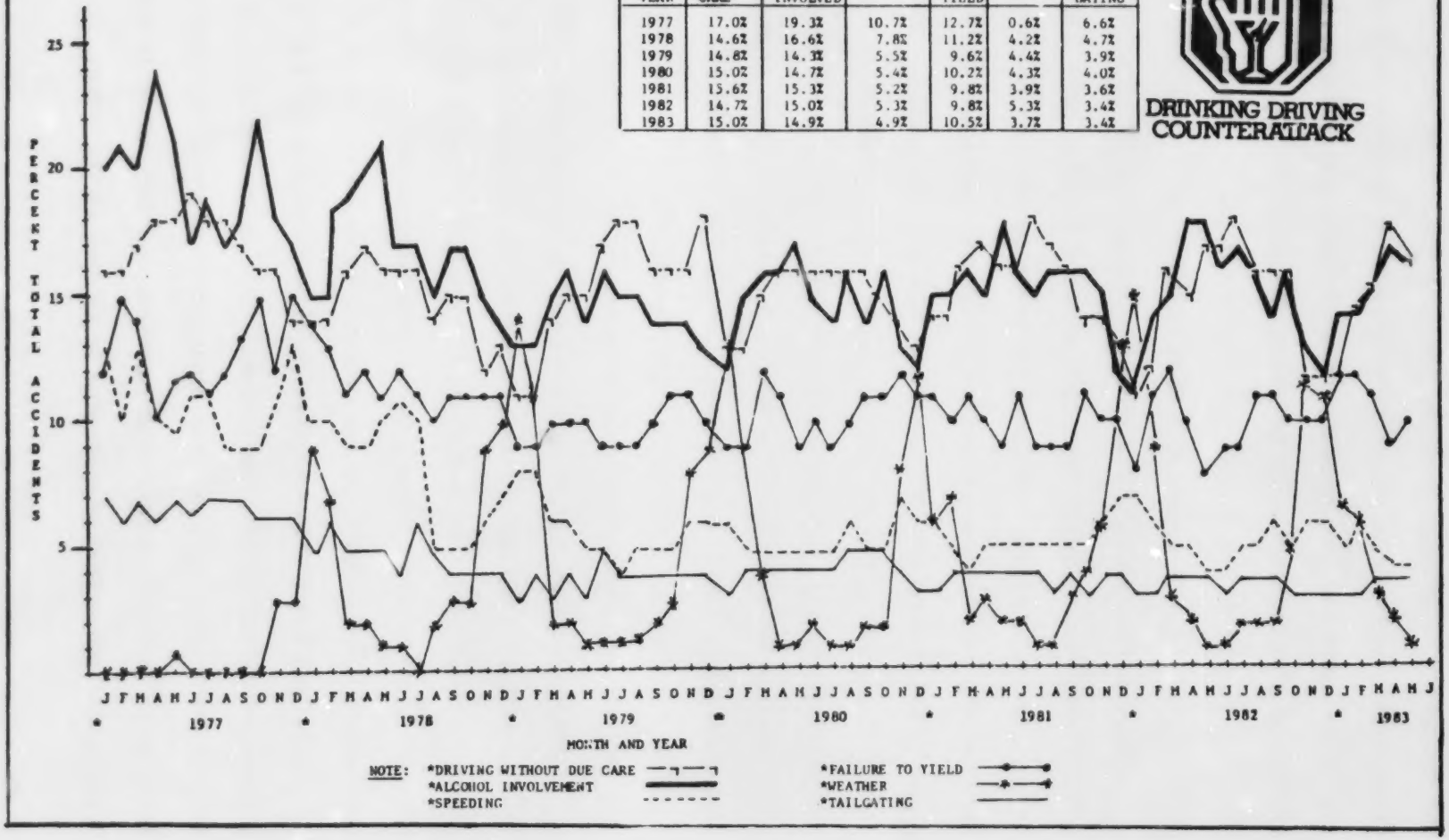

PERCENT TOTAL ACCIDENTS
25
20
15
10
5
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
1977
1978
1979
1980
1981
1982
1983
MONTH AND YEAR
NOTE: *DRIVING WITHOUT DUE CARE
*ALCOHOL INVOLVEMENT
*SPEEDING
*FAILURE TO YIELD
*WEATHER
*TAILGATING

FIGURE 2 -4

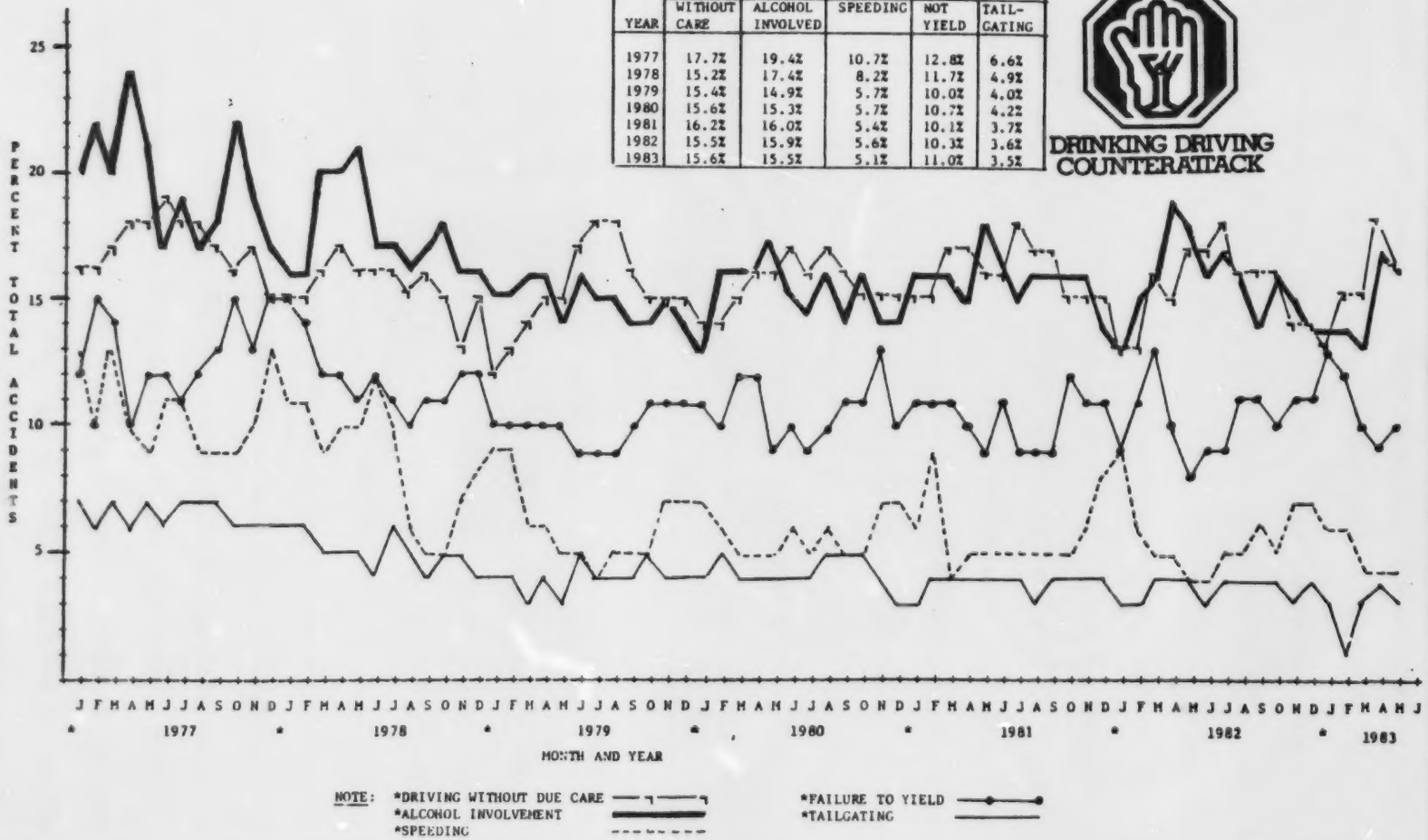
CASUALTY TRAFFIC ACCIDENTS, JANUARY 1977- MAY 1983, BRITISH COLUMBIA:

PERCENT ASSOCIATED WITH FREQUENTLY CITED CONTRIBUTING FACTORS- DRIVER 1, FACTOR 1 ONLY.

ALL ACCIDENTS CITING WEATHER AS THE PRIMARY CONTRIBUTING FACTOR HAVE BEEN REMOVED FROM THE CALCULATIONS

	YEARLY AVERAGES				
YEAR	WITHOUT CARE	ALCOHOL INVOLVED	SPEEDING	NOT YIELD	TAIL-GATING
1977	17.7%	19.4%	10.7%	12.8%	6.6%
1978	15.2%	17.4%	8.2%	11.7%	4.9%
1979	15.4%	14.9%	5.7%	10.0%	4.0%
1980	15.6%	15.3%	5.7%	10.7%	4.2%
1981	16.2%	16.0%	5.4%	10.1%	3.7%
1982	15.5%	15.9%	5.6%	10.3%	3.6%
1983	15.6%	15.5%	5.1%	11.0%	3.5%

DRINKING DRIVING COUNTERATTACK


PERCENT TOTAL ACCIDENTS
25
20
15
10
5
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
1977
1978
1979
1980
1981
1982
1983
MONTH AND YEAR
NOTE: *DRIVING WITHOUT DUE CARE
*ALCOHOL INVOLVEMENT
*SPEEDING
*FAILURE TO YIELD
*TAILGATING

Factor to casualty accidents dropped from 19.4% in 1977 to 14.9% in 1979, then rose slightly and remained more-or-less stable at around 16%.

Figure 3-4 shows that Driving While Impaired enforcement, as reflected in changes laid, and drinking driving as reflected in the number of alcohol involved accidents parallel each other closely, with about a 1-month lag between enforcement and accidents. That is, about a month after enforcement increases, accidents decrease. Further, this figure shows that the ratio of enforcement to accidents is decreasing. For example, in 1977 there were 6.6 Driving While Impaired charges laid in the province to every one alcohol-related accident, while the ratios for the following years are 6.3:1, 5.6:1, 5.3:1, 5.2:1, 5.7:1.

Combining information from Figures 2-4 and 3-4, it would appear that the likelihood of being in an alcohol-related casualty accident has remained stable for the past few years, while the likelihood of being apprehended for drinking driving has been decreasing since 1977.

DISCUSSION AND RECOMMENDATIONS

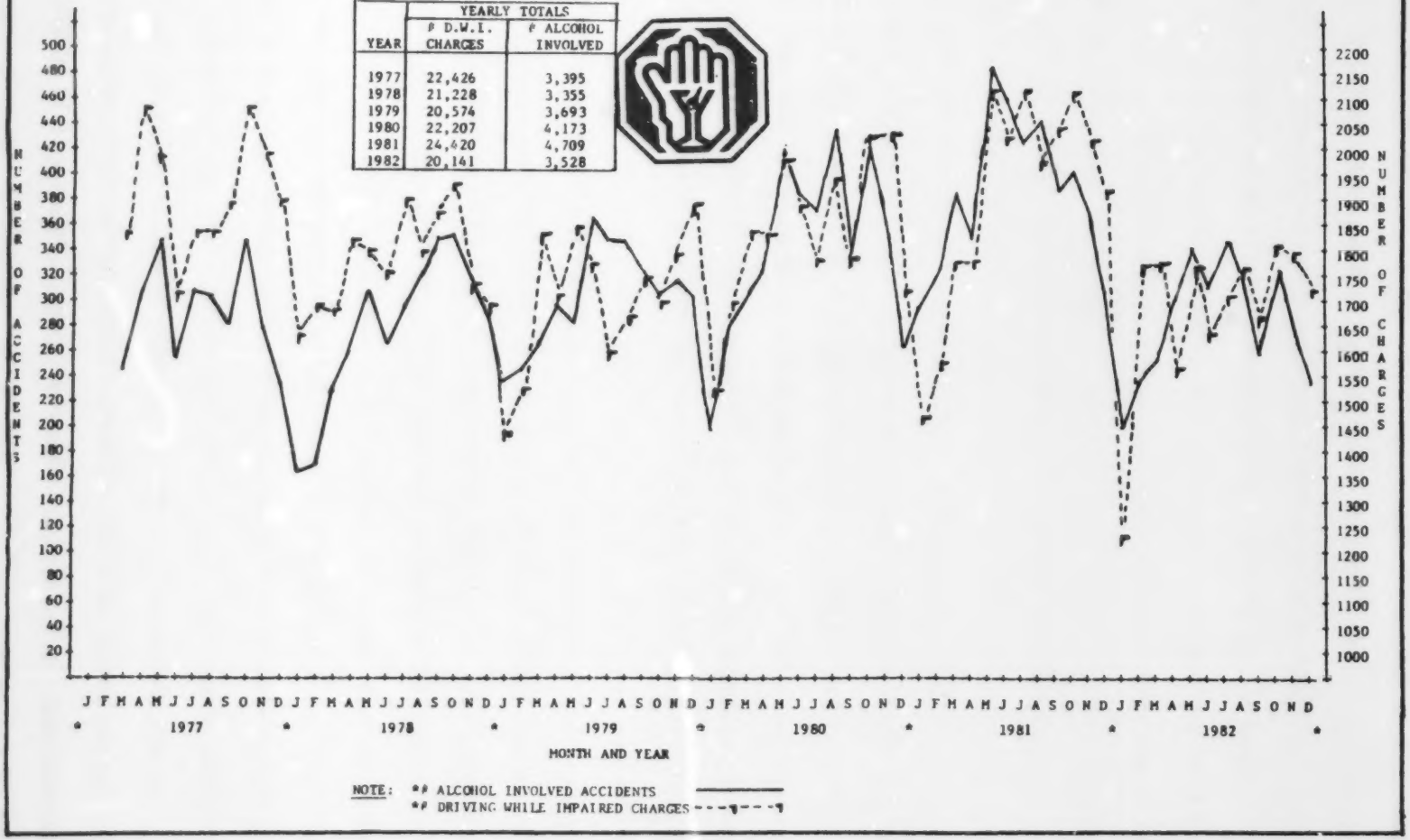
Before discussing results of this report, at least two qualifications must be noted. First, the assessment of contributing factors to these casualty accidents is done largely by the police at the accident scene, and thus these factors reflect the judgement of the officer within a reasonably stressful context, as opposed to being the absolute authority on the precise cause of the accident. Second, as a person becomes sensitized to an issue, that person will begin to see manifestations of that issue where previously those manifestations had been ignored. Therefore, it may be that as the CounterAttack program has made the police more cognizant of the effects of and issues surrounding drinking driving, they could well have

FIGURE 3-4

ALCOHOL-INVOLVED CASUALTY TRAFFIC ACCIDENTS, JANUARY 1977- DECEMBER 1982, BRITISH COLUMBIA (DRIVER 1, FACTOR 1 ONLY).

DRIVING WHILE IMPAIRED CHARGES LAID, MARCH 1977-DECEMBER 1982, BRITISH COLUMBIA.

YEAR	YEARLY TOTALS # D.W.I. CHARGES	# ALCOHOL INVOLVED
1977	22,426	3,395
1978	21,228	3,355
1979	20,574	3,693
1980	22,207	4,173
1981	24,420	4,709
1982	20,141	3,528



NOTE: *# ALCOHOL INVOLVED ACCIDENTS ——————

*# DRIVING WHILE IMPAIRED CHARGES - - -¶- - -¶

begun to more frequently note Alcohol Involvement as the primary contributing factor to casualty accidents, thus somewhat inflating the Alcohol Involvement Contributing Factor over the years.

In short, the data used in this report should be interpreted as indicative of trends as opposed to the reporting of absolute frequencies and proportions.

Trends:

Overall, as measured by Contributing Factor #1 Driver #1 on the MV104, the proportion of casualty accidents attributable to alcohol dropped from about 19% in 1977 to about 15% in 1979, increased slightly in 1980 to about 16% and remained about at that level to May, 1983. Because there is no comparable information on pre-1977 levels, it is impossible to know if the drop and levelling out of these proportions represents a real decrease in alcohol-related casualty accidents from pre-1977 levels or is only a function of 1977 having had an unusually high proportion of these accidents.

Nonetheless it does not seem unreasonable to suggest that there has been perhaps an overall 10% reduction in alcohol-related casualty accidents, (i.e. from about 19% to about 16% of all casualty accidents is a 15.8% reduction in alcohol-related, thus suggesting only an overall 10% reduction is a reasonably conservative position). This in turn would translate into somewhere between a 1% and 2% reduction in all casualty accidents, with perhaps a similar effect on Property Damage Only traffic accidents.

Within the overall trend for alcohol-related casualty accidents, there is a strong yearly seasonal decrease in December-January, and a yearly seasonal peak in the Spring and early Summer. These will be discussed in more detail below.

Turning to Driving While Impaired (DWI) charges laid, they do not seem to be keeping up with the growing absolute number of drinking drivers, as reflected by the growing absolute number of alcohol-related casualty accidents. That is, while the percent of accidents attributable to alcohol has been relatively steady since 1980, the number of people driving has been increasing and thus the actual number (as opposed to percentage) of alcohol-related accidents has been increasing. However, the number of DWI charges laid has not been increasing at the same rate. For example, in 1977 there were 22,426 DWI charges laid and 3,395 alcohol-related casualty accidents, while in 1982 there were only 20,141 charges laid (a 10% decrease from 1977) and 3,528 alcohol-related casualty accidents (a 4% increase from 1977). In short, the likelihood of being apprehended for drinking driving has been decreasing since 1977.

Seasonally, the pattern of DWI charges seem to closely precede the pattern of alcohol-related casualty accidents, with accident rates decreasing a month or so after increased enforcement. This suggests that enforcement of DWI laws in fact can affect alcohol-related accident rates.

CounterAttack:

It is a well accepted principle among psychologists and criminologists that the strength of the fear of apprehension and punishment relates strongly to the likelihood of committing a forbidden act - the more a person thinks they will be caught and punished for doing something, the less likely they are to do that thing. With regard to drinking driving, the actual probability of being caught has been steadily decreasing since 1977, and is at its very lowest every January, yet the proportion of alcohol-related casualty accidents has been stable for the past few years, and is at its very lowest in January. The explanation for this apparent

contradiction comes when one remembers it is the perception of the probability of apprehension, not the actual likelihood that deters the driver from drinking.

Arguably, CounterAttack and other similar programs have kept the drivers of British Columbia aware of the dangers of drinking and driving, thus helping to keep the problem under control. The powerful effect of media-based anti-drinking driving campaigns can easily been seen by examining the December-January periods, when the CounterAttack media campaign is at its strongest during the year, and the number and proportion of alcohol-related casualty traffic accidents is at its lowest during the year. Clearly, the program has an effect.

However, it would be extremely useful to be able to more precisely measure the effects of the CounterAttack program, as it is certainly not the only contributor to the drivers' attitudes and behaviours associated with drinking driving. As noted above, enforcement levels relate to drinking-driver accidents, as probably do American mass media programs received in B.C., as probably do the efforts of such groups as Mothers Against Drunk Driving (MADD).

Conclusions and Recommendations:

Through the efforts of CounterAttack, among other groups, drinking driving in B.C. has been somewhat reduced, with the proportion of alcohol-related casualty traffic accidents remaining stable since early in 1980. However, it is unlikely that further reduction can occur without a new initiative being directed at the problem. Fortunately, and probably not in small part due to the educational programs of CounterAttack, the public appears to be ready for a second attack on drinking driving. From the analyses presented in this chapter, three recommendations can be drawn:

1. Enforcement of Driving While Impaired laws should increase with a parallel increase in media coverage, especially in the high accident times of Spring and early Summer.
2. Regular studies should be carried out to both monitor the public's perception of apprehension for drinking driving and their perception of the CounterAttack program in order to be able to increase the program's usefulness in affecting drivers' attitudes and behaviours.
3. Most importantly, if British Columbia hopes to further reduce alcohol-related casualty accidents, a thorough examination of what is currently being done and what ought to be done in addition needs to be undertaken.

Finally, to place this reduction of alcohol-related casualty accidents in perspective, if one assumes that in each year from 1977 alcohol-related casualty accidents have been no more than 90% of the frequency than one might expect had there been no prevention program, then one can calculate that between 1978 and 1982 inclusive, 146 deaths and 4,246 injuries have been avoided, which translates into a cost saving of about $43,920,000 to the Insurance Corporation of British Columbia alone, based on the I.C.B.C. cost estimate of $10,000 per injury or death.

SECTION II

LOCATION AND CIRCUMSTANCES

*Geographic Location
*Situational Characteristics

CHAPTER FIVE

SIX MOST FREQUENTLY CITED CONTRIBUTING FACTORS TO CASUALTY TRAFFIC ACCIDENTS BY GEOGRAPHIC LOCATION, B.C. 1982*

From Chapter Three, it can be seen that the six causes most cited causes to casualty traffic accidents are, in descending order: Driving Without Due Care, Alcohol Involvement, Unsafe Speed, Failure to Yield Right of Way, Weather, and Following too Closely ("tailgating"). However, in order to effectively allocate limited public education and police resources to combatting these accident causes, one must first know where these causes occur most often. Consequently, it is the purpose of this chapter to examine the relative frequency of these six causes in terms of their incidence within the geographical bounds of the major police reporting groups throughout the province.

ANALYSES

From the B.C. 1982 MV104 reports involving casualties, accidents were considered in terms of whether or not each of the following causes was indicated as a contributing factor: Driving Without Due Care, Alcohol Involvement, Unsafe Speed, Failure to Yield Right of Way, Weather and Following too Closely ("tailgating"). Each of these contributing factors were then divided in terms of the police reporting groups associated with the accidents (See Appendix E page 112 for a breakdown of the geographical locations covered by these reporting groups).

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*The information presented in this chapter comes from the CounterAttack Brief Report #4, Ministry of Attorney General, May, 1983.

RESULTS AND DISCUSSION

Table 1-5 on page 44 shows the total number of casualty traffic accidents for each police reporting group for 1982 as well as the percent of these accidents where any of the six causal factors were cited as a contributing factor on the Traffic Accident Report Form (MV104). Each of these six most frequently cited contributing factors will be examined separately in terms of the geographical locations of the police reporting groups and then some general conclusions will be drawn.

Driving Without Due Care:

Provincially, Driving Without Due Care was cited as a contributing factor in 30% of the casualty traffic accidents in B.C. in 1982. This factor was cited least often by the Vancouver Independent group (23%) and most often by: Kamloops Municipal (43%), Courtenay Rural (38%), Victoria Rural (37%) and R.C.M.P. District 1 Rural (36%) reporting groups. Overall, there appeared to be no systematic differences between the rural and municipal reporting on this factor.

Alcohol Involvement:[1]

Provincially, Alcohol Involvement was cited as a contributing factor in 19% of the casualty traffic accidents in B.C. in 1982. This factor was cited least often by the Vancouver Independent reporting group (15%) and most often by: Prince Rupert Rural (29%), Prince Rupert Municipal (28%)

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1 These figures differ slightly from those reported in Alcohol-Related Traffic Accidents by Geographic Location, B.C., 1982 (Ministry of Attorney General, June 1983) due to a change in the method of computation. However, it should be noted that the relative ranking of the reporting groups on this factor has not changed.

TABLE 1-5
SIX MOST FREQUENTLY CITED CONTRIBUTING FACTORS TO TRAFFIC CASUALTY ACCIDENTS BY GEOGRAPHICAL LOCATIONS, B.C., 1982

POLICE REPORTING GROUP*	TOTAL # ACCIDENTS	% W/O DUE CARE	% ALCOHOL	% SPEEDING	% NOT YIELD	% WEATHER	% TAIL-GATE
Kelowna Municipal	1,010	30	18	16	18	8	9
Kelowna Rural	1,154	27	21	24	8	15	5
Kamloops Municipal	632	43	21	19	19	7	10
Kamloops Rural	852	35	22	24	2	14	2
Nelson Municipal	191	35	20	18	20	14	7
Nelson Rural	1,018	29	21	22	5	21	2
Prince George Municipal	726	30	20	19	18	12	5
Prince George Rural	862	29	19	22	4	19	3
Prince Rupert Municipal	244	28	28	16	14	16	3
Prince Rupert Rural	417	32	29	25	4	13	2
R.C.M.P. Dist. 1 Mun.	6,439	29	18	14	20	11	11
R.C.M.P. Dist. 1 Rural	813	36	24	25	7	17	5
Victoria Municipal	609	33	24	18	17	9	8
Victoria Rural	883	37	27	26	9	13	7
Courtenay Municipal	396	34	22	19	20	6	8
Courtenay Rural	799	38	21	29	6	14	5
Freeway R.C.M.P.	528	33	16	18	3	17	13
Vancouver Independent	4,916	23	15	10	23	9	5
Victoria Independent	1,541	34	19	13	19	8	10
Nelson Independent (?)	48	25	27	25	17	13	2
Other Police (?)	10	50	20	70	0	10	0
B.C. Total	24,142	30%	19%	17%	16%	12%	7%

* SEE APPENDIX A FOR A BREAKDOWN OF THESE GROUPS

NOTE: 1. There were 120 Missing Cases. These figures are based on a less limited characterization of what constitutes a missing case than have previous Brief Reports and thus allows a more comprehensive inclusion of cases in the calculations.

2. The Highest and Lowest Figures in each category are highlighted.

3. (?) = Numbers too small to interpret.

and Victoria Rural (27%) reporting groups. Overall, there appeared to be a tendency for this factor to be cited more in rural accidents than in accidents occurring in municipal areas.

Unsafe Speed:

Provincially, Unsafe Speed was cited as a contributing factor in 17% of the casualty traffic accidents in B.C. in 1982. This factor was cited least often by: the Vancouver Independent reporting group (10%) and most often by Courtenay Rural (29%), Victoria Rural (26%), R.C.M.P. District 1 Rural (25%) and Prince Rupert Rural (25%) reporting groups. Overall, there was a clear tendency for Unsafe Speed to be cited as a contributing factor in rural accidents.

Failure to Yield Right of Way:

Provincially, Failure to Yield Right of Way was cited as a contributing factor in 16% of the casualty traffic accidents in B.C. in 1982. This factor was cited least often by the Kamloops Rural reporting group (2%) and most often by: Vancouver Independent (23%), Courtenay Municipal (20%), R.C.M.P. District 1 Municipal (20%), and Nelson Municipal (20%) reporting groups. Overall, Failure to Yield Right of Way was cited as a contributing factor very frequently in accidents occurring in municipal areas and very seldom in rural accidents.

Weather:

Provincially, the Weather was cited a contributing factor in 12% of the casualty traffic accidents in B.C. in 1982. This factor was cited least often by the Courtenay Municipal reporting group (6%) and most often by Nelson Rural (21%), Prince George Rural (19%), Freeway R.C.M.P. (17%) and R.C.M.P. District 1 Rural (17%) reporting groups. Overall, Weather was

cited much more frequently as a contributing factor to rural accidents than to accidents occurring in municipal areas.

Following Too Closely:

Provincially, Following Too Closely was cited in 7% of the casaulty traffic accidents in B.C. in 1982. This factor was cited least often by the Prince Rupert Rural reporting group (2%), the Nelson Rural reporting group (2%) and the Kamloops Rural reporting group (2%) and most often by: Freeway R.C.M.P. (13%), R.C.M.P. District Municipal (11%), Kamloops Municipal (10%) and Victoria Independent (10%) reporting groups. Overall, Following Too Closely was cited as a contributing factor much more frequently in accidents that occurred in municipal as opposed to rural areas with the one exception of freeway accidents.

General Conclusions:

Clearly, the six most commonly cited contributing factors to casualty traffic accidents each are cited with different frequencies in different geographical locations and often in different sorts of driving environments (i.e., municipal vs rural). It is beyond the scope of this research to determine as to why these variations occur. However, it is imperative that, in a climate of diminishing resources and spending restraint, police and public education efforts be directed where they will be most effective, both in terms of the target driving behaviours to be changed and in terms of the geographical locations that are to be affected. For example, it would make more sense to increase enforcement on Failure to Yield (provincially cited in 16% of the accidents) in the Vancouver area (locally cited in 23% of the accidents) than to crack downon Following Too Closely (provincially cited in only 7% of the accidents) in Prince Rupert Municipal area (locally cited in only 3% of the accidents). In short, these figures most certainly ought to be used when

planning local and regional policing and traffic safety education.

Turning to alcohol-related casualty accidents specifically, as noted above, it is not within the scope of this chapter to determine as to why there are such marked regional variations in these accidents. Further, it must be kept in mind that these figures represent the proportions of alcohol-related accident rates, not drinking driving rates, although one might assume that the two are somewhat related. However, in terms of saving lives, concentration on reducing alcohol-related accidents must take precedence over reducing drinking driving. That is, it could well be that there is a higher proportion of drinking drivers in municipal as opposed to rural areas, but there are more alcohol-related accidents in rural areas due to higher speed limits, poorer road conditions, less perception of apprehension or whatever. Therefore, resources aimed at reducing the proportion of alcohol-related accidents would need to be directed to the rural areas, even though the proportion of drinking drivers there may be less than in the municipal areas.

In sum the figures on alcohol-related casualty traffic accidents presented in this chapter suggest:

1. The resources available to reduce the frequency of alcohol-related traffic accidents (i.e. enforcement, public education) be deployed discriminately, and focus on locations having the highest proportion of alcohol-related accidents.
2. In particular, the rural areas, Victoria R.C.M.P. and Prince Rupert R.C.M.P. areas be allocated additional resources to reduce alcohol-related crashes.
3. Knowledge of the relative proportions of alcohol-related crashes in different locations be used as the dependent variable in tests of enforcement and public information campaigns.

CHAPTER SIX

SITUATIONAL CHARACTERISTICS OF ALCOHOL-RELATED TRAFFIC ACCIDENTS, BRITISH COLUMBIA, 1982 *

In order to most efficiently deploy the limited available enforcement and public education resources in an effort to reduce alcohol-related traffic accidents, it is necessary to know the characteristics of these accidents in comparison with other traffic accidents. In particular, comparisons involving the times, locations, road characteristics and ambient environmental characteristics (i.e. weather, lighting) of alcohol-related traffic accidents to other traffic accidents need to be made. From these comparisons, educators can characterize alcohol-related accidents for the public, while enforcement agencies can become more sensitive to times and locations that are likely to be associated with a particularly high proportion of alcohol-related accidents.

Consequently, it is the purpose of this chapter to compare alcohol-related casualty traffic accidents with other casualty traffic accidents in terms of when, where, and under what conditions these accidents occur. In particular, when the accident occurred is considered in terms of the month, day of week and time of day of the accident. The location of the accident is examined in terms of: the general type of buildings and development in the accident area; the incident location on the road (e.g. at intersection); and the posted speed zones and traffic control devices at or near the incident. The conditions under which the accident occurred are examined in terms of both the ambient conditions of weather, road surface conditions (e.g. wet, dry) and lighting, and the road conditions of horizontal and vertical characteristics and of road surface (e.g. asphalt, gravel).

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* The information presented in this chapter comes from a re-analysis of the data presented in CounterAttack Brief Report #6, Ministry of Attorney General, June, 1983.

In addition, in order to put these situational variables into perspective, the number of vehicles, location of first contact (e.g. on road vs off road) and the collision object (e.g. other vehicle, tree) of the accident are examined.

The information used in this chapter has been taken from the Traffic Accident Report Form (MV104) and pertains to all casualty traffic accidents in British Columbia in 1982.

ANALYSES

From the B.C. 1982 MV104 reports involving casualties, the following variables were extracted for each accident: number of vehicles involved; the Location of First Contact; the Collision Object; the month, day of week, and time of day of the accident; the Land Usage in Incident Area; Incident Location; Speed Zone; Traffic Control; Weather Condition; Roadway Surface Condition; Lighting Conditions; Horizontal Roadway Character; Vertical Roadway Character; and Road Type. (See Appendix C page 110 for the MV104 scoring key).

Each of the above variables were then examined in terms of whether or not alcohol was involved in the accident. Alcohol was considered to be involved if it was listed as a primary secondary or tertiary contributing factor for one or more drivers. That is, if any alcohol was thought to be involved in the accident, it was classified as alcohol-involved.

RESULTS

Number of Vehicles, Collision Object and Object Location:

From Table 1-6 on page 50 it can be seen that provincially about 19.0% of the casualty traffic accidents in 1982 involved alcohol and of those,

TABLE 1-6

NUMBER OF VEHICLES IN CASUALTY ACCIDENT BY ALCOHOL INVOLVEMENT

Number of Vehicles	Total # Accidents	% Accidents where Driver(s) Drinking
1 vehicle	9,870	27.0
2 vehicles	12,435	13.3
3 vehicles	1,470	14.1
4 vehicles	295	18.3
5+ vehicles	68	23.5
Provincial Total	24,144	19.0%

Note: there were 124 missing cases

TABLE 2-6
LOCATION OF FIRST CONTACT BY ALCOHOL INVOLVEMENT

Location of 1st Contact	Total # Accidents	% Accidents where Driver(s) Drinking
On Roadway	17,115	15.1
Off Roadway	5,898	31.5
Provincial Total	23,013	19.3%

Note: There were 1,249 missing cases

the category with the highest proportion of alcohol-related accidents was the single-vehicle category at 27.0%. Two-vehicle and three vehicle accidents involving alcohol were well below the provincial proportion of 19.0% at 13.3% and 14.1% respectively. On the other hand, while there were relatively few accidents involving 5 or more vehicles, alcohol was involved in 23.5% of same. However, generally speaking, the majority of alcohol-related vehicle casualty accidents in 1982 involved single vehicles (58.0%).

The location of the first contact in the accident was most frequently off of the roadway for alcohol-related accidents, as can be seen from Tables 2-6 and 3-6 on pages 50 and 52. From Table 2-6 it can be seen that the driver(s) had been drinking in 31.5% of the accidents where the first contact was off of the road, while alcohol was involved in only 15.1% of the accidents where the first contact was on the roadway.

Table 3-6 illustrates the categories of objects that the vehicles involved in casualty accidents collided with and the percent of accidents where the driver was thought to have been drinking in each category. As might be expected from the results noted in Table 2-6, the object-categories having the highest proportion of alcohol-related accidents describe objects that are found off or to the side of the road, while the lowest proportion of alcohol-related accidents are associated with collision objects normally found on the road. For example, 42.3% of accidents involving a collision with a light support pole, 47.2% of accidents involving a collision with a utility support pole, and 47.9% of accidents involving a collision with a sign post were alcohol-related. On the other hand, only 4.5% of accidents involving a collision with a bicycle, 14.6% of accidents involving a collision with another motor vehicle, and 14.4% of accidents involving a collision with a pedestrian were alcohol-related.

TABLE 3-6

COLLISION OBJECT BY ALCOHOL INVOLVEMENT

Collision Object	Total # Accidents	% Accidents where Driver(s) Drinking
Other Motor Vehicle	12,248	14.0
Motorcycle	774	13.4
Pedestrian	1,821	13.9
Bicycle	961	4.2
Animal	219	3.7
Railroad Train	25	8.0
Streetcar	13	46.2
All Terrain Vehicle	12	25.0
Moped	3	0.0
Light Support Pole	345	42.3
Utility Support Pole	566	41.9
Guard Rail	214	29.9
Crash Cushion	31	41.9
Sign Post	109	45.0
Tree	305	33.4
Building/Wall	118	39.0
Curb	294	38.4
Fence	111	34.2
Bridge Structure	124	34.7
Median Island	96	33.3
Snowbank/Drift	104	18.3
Rockface/Rock on Road	148	23.0
Ditch	1,756	28.4
Culvert	46	28.3
Fire Hydrant	21	38.1
Overturned	398	23.9
Fire/Explosion	7	28.6
Provincial Total	20,869	17.7%

Note: There were 3,393 missing cases

From the above, one might characterize the alcohol-related accident as a single-vehicle event where the driver lost control of the vehicle, ran off the road, and hit an object at the side of the road.

Month Day and Time of Accidents:

The total number of casualty accidents and the proportion of alcohol-related casualty accidents for each month of 1982 is illustrated in Table 4-6 on page 54. From this, it can be seen that the lowest proportions of alcohol-related accidents occurred during the winter months of January (16.0%), February (19.2%), November (18.1%) and December (17.5%), while the highest proportion occurred in the Spring, with April at 24.3% and May at 24.2%.

As one might expect, Table 5-6 on page 54 shows that the highest proportion of alcohol-related casualty accidents are associated with the week-ends, while Table 6-6 on page 55 shows the highest proportions in the late evenings and early mornings. As it an be reasonably argued that people tend to drink on week-ends and during the evenings, it is not unusual that this is when the highest proportion of alcohol-related accidents occur.

From the above, one might characterize the alcohol related-accident as occurring late in the day, late in the week, and to be much less likely in the Winter than in the Spring.

Land Use Area, Incident Location, Speed Zone and Traffic Control Devices:

Table 7-6, page 56, distributes casualty accidents according to the primary land use in the accident area, and then shows the total number of these accidents and proportions of alcohol-related accidents within each land use category. From this it can be seen that the Recreation Areas category had the highest proportion of alcohol-related accidents (23.8%),

TABLE 4-6

CASUALTY ACCIDENT MONTH BY ALCOHOL INVOLVEMENT

Month of Accident	Total # Accidents	% Accidents where Driver(s) Drinking
January	1,893	14.7
February	1,789	17.4
March	1,773	18.7
April	1,756	22.9
May	2,013	22.4
June	2,130	19.4
July	2,216	20.3
August	2,086	20.0
September	1,981	19.3
October	2,275	19.9
November	2,217	16.9
December	2,015	16.5
Provincial Total	24,144	19.0%

Note: There were 118 missing cases

TABLE 5-6

CASAULTY ACCIDENT DAY OF WEEK BY ALCOHOL INVOVLEMENT

Day of Week	Total # Accidents	% Accidents Where Driver(s) Drinking
Monday	2,749	11.0
Tuesday	3,044	13.2
Wednesday	3,098	15.2
Thursday	3,283	16.9
Friday	4,289	18.8
Saturday	4,396	27.3
Sunday	3,285	26.1
Provincial Total	24,144	19.0%

Note: There were 118 missing cases

TABLE 6-6

TIME OF CASUALTY ACCIDENT BY ALCOHOL INVOLVEMENT

Time of Accident	Total # Accidents	% Accidents where Driver(s) Drinking
Midnight - 2 a.m.	1,917	49.5
2 a.m. - 4 a.m.	1,323	54.5
4 a.m. - 6 a.m.	538	41.3
6 a.m. - 8 a.m.	1,038	10.3
8 a.m. - 10 a.m.	1,606	4.6
10 a.m. - Noon	1,964	4.0
Noon - 2 p.m.	2,508	4.1
2 p.m. - 4 p.m.	3,135	5.5
4 p.m. - 6 p.m.	3,319	10.2
6 p.m. - 8 p.m.	2,594	19.9
8 p.m. - 10 p.m.	2,051	26.8
10 p.m. -Midnight	1,839	37.4
Provincial Total	23,832	19.0%

Note: There were 430 missing cases

TABLE 7-6

AREA DESCRIPTION BY ALCOHOL INVOLVEMENT

Area Description	Total # Accidents	% Accidents where Driver(s) Drinking
School Playground	643	16.0
Family/Residential	7,177	22.1
Apartment/Residential	1,081	19.1
Business/Shopping	6,007	15.1
Industrial/Manufacturing	1,394	19.9
Agricultural/Undeveloped	6,281	21.0
Recreational Area/Campground	661	23.8
Provincial Total	23,244	19.6%

Note: There were 1,018 missing cases

followed by Family/Residential (22.1%) and Agricultural/Undeveloped at 22.0% while the lowest alcohol-related proportions were in Business/ Shopping areas (15.1%) and School/Playground areas (16.0%).

From Table 8-6 on page 58 it can be seen that each of the following categories had a relatively high proportion of alcohol-related accidents: Off the Highway (29.4%); Exit Lane (31.8%); Exit Ramp (27.8%); and Between Intersections (23.4%). On the other hand, while a large number of accidents occurred at intersections (10,090), only 14.1% were alcohol-involved.

Table 9-6 on page 59 breaks casualty accidents down in terms of the posted speed zone in the accident area and displays the proportion of alcohol-related accidents within each zone. No clear pattern emerges from these proportions.

As can be seen from table 10-6 on page 59, with the exception of the relatively few casualty accidents that occurred at R.R. crossings (50) and the relatively high proportion of same that involved alcohol (28.0%), the category indicating that there were no traffic control devices had highest proportion of alcohol-related accidents (21.5%) when compared to other areas.

From the above one gets the impression that the alcohol-related accident, when compared to the accident involving sober driver(s), is more likely to occur on a more-or-less nondescript portion of the road, between intersections with no traffic control devices in the immediate area (because none are needed). The land use in the area of the alcohol-related casualty accident was similarly likely to be quite common - a Family/Residential area or Agricultural/Undeveloped area, although, Recreational/Campground areas showed the highest proportion of alcohol-related to not alcohol-related traffic accidents. Finally, the

TABLE 8-6

INCIDENT LOCATION BY ALCOHOL INVOLVEMENT

Incident Location	Total # Accidents	% Accidents where Driver(s) Drinking
At Intersection	9,906	14.1
Between Intersections	10,090	23.4
Intersection of Road and Drive-Way or Alley	1,340	15.4
Bridge	568	19.0
Ferry or Dock	21	14.3
Tunnel	21	0.0
Exit Deceleration Lane	22	31.8
Exit Ramp	79	27.8
Exit Intersection	38	5.3
Entrance Acceleration Lane	52	15.4
Entrance Ramp	83	18.1
Entrance Intersection	51	13.7
Off Highway	1,006	29.4
Parking Lot	417	15.8
Railroad Crossing	5	40.0
Provincial Total	23,699	19.0%

There were 563 missing cases

TABLE 9-6

POSTED SPEED ZONE BY ALCOHOL INVOVLEMENT

Speed Zone	Total # Accidents	% Accidents where Driver(s) Drinking
10 KMH	81	12.3
20 KMH	125	21.6
30 KMH	542	16.8
40 KMH	107	16.8
50 KMH	9,546	19.1
60 KMH	2,176	22.0
70 KMH	275	22.9
80 KMH	3,108	16.7
90 KMH	1,432	18.6
100 KMH	6,752	19.3
Provincial Total	24,144	19.0%

Note: There were 118 missing cases

Table 10-6

TRAFFIC CONTROL DEVICE BY ALCOHOL INVOLVEMENT

Location of 1st Contact	Total # Accidents	% Accidents where Driver(s) Drinking
None	16,225	21.5
Stop Sign	4,098	12.2
Yield Sign	758	20.4
Officer/Flagman	120	15.0
R.R. Crossing Sign	50	28.0
Red Light	1,057	17.0
Amber Light	257	6.6
Green Light	933	12.5
Advance or Flashing Light	163	8.6
Other	100	17.0
Provincial Total	23,761	19.0%

Note: There were 501 missing cases.

proportions of alcohol-related accidents within posted speed zones showed no particular patterns.

Weather, Road Surface Conditions, Lighting:

Unlike what might be expected, Tables 11-6 and 12-6 on page 61 show that alcohol-related accidents are least likely to comprise a higher proportion of accidents in bad weather and bad road surface conditions. For example, accidents in clear weather had an alcohol-related proportion of 19.7%, while accidents in snow or sleet had only 9.5%. Further, dry road conditions accidents had an alcohol-related proportion of 20.6%, but the proportion of alcohol-related accidents dropped to 21.2% for wet road conditions, 13.0% for muddy road conditions, 11.6% for snow conditions, and only 9.5% for icy road conditions. The lowest proportion of alcohol-involved accidents was for slushy road conditions at 8.7%.

The figures in Table 13-6 on page 62 showing that "dark" lighting conditions have the highest proportion of alcohol-related traffic accidents are to be expected, considering the times of day of these sorts of accidents illustrated in Table 6-6. That is, alcohol-related traffic accidents tend to occur in high proportions at night, and of course these accidents would be classified into the "dark" lighting conditions groups. However, it is worth noting that the "dark-full light" condition has a lower proportion of alcohol-related accidents (34.0%) than either the "dark-no light" (36.3%) or "dark-some light" (38.3%) condition, leading one to the notion that lighting may have an effect in reducing these accidents irrespective of the time of day of the accident.

From the above, alcohol-related traffic accidents can be contrasted to accidents involving sober drivers as more likely to occur in a high proportion in good driving weather and on good driving road conditions, and

TABLE 11-6

WEATHER BY ALCOHOL INVOLVEMENT

Weather	Total # Accidents	% Accidents where Driver(s) Drinking
Clear	11,831	19.7
Cloudy	6,594	20.2
Rain	4,193	17.8
Snow/Sleet	1,086	9.5
Fog	215	19.1
Other	42	19.0
Provincial Total	23,961	10.9%

Note: there were 301 missing cases

TABLE 12-6

ROAD SURFACE CONDITIONS BY ALCOHOL INVOLVEMENT

Road Surface Conditions	Total # Accidents	% Accidents where Driver(s) Drinking
Dry	14.306	20.6
Wet	6,683	19.7
Muddy	54	13.0
Snow	939	11.6
Slush	343	8.7
Ice	1,628	9.5
Provincial Total	23,953	19.1%

Note: There were 309 missing cases

TABLE 13-6

LIGHTING CONDITIONS BY ALCOHOL INVOLVEMENT

Lighting Conditions	Total # Accidents	% Accidents where Driver(s) Drinking
Daylight	13,612	7.3
Dawn	433	22.6
Dusk	943	19.2
Dark - Full Light	2,029	34.0
Dark - No Light	3,107	36.3
Dark - Some Light	3,839	38.3
Provincial Total	23,963	19.0%

Note: there were 299 missing cases

in a low proportion in bad driving conditions. Perhaps drinking drivers are more cautious in bad weather conditions. In addition, good lighting may reduce the proportion of alcohol-related accidents irrespective of the time of day of the accident.

Horizontal and Vertical Road Characteristics, Road Surface Materials:

Table 14-6 on page 64 shows that alcohol-related traffic accidents have a higher likelihood of occurring on a curved road than on a straight road. For example, 17.7% of the accidents on a straight road were alcohol-related, while 26.4% of the accidents on a single curve were alcohol-related. On the other hand, as can be seen from Table 15-6 on page 64 vertical road characteristics (i.e. road grade) do no appear to appreciably affect the likelihood of alcohol-related accidents. Similarly, the road surface composition also does not appear to affect these sorts of accidents, as illustrated by Table 16-6 on page 64.

From the above, alcohol-related traffic accidents can be contrasted to those involving sober drivers as more likely to occur on curved road sections as opposed to straight road sections, while the road grade and road surface composition seems not to appreciably affect these sorts of accidents.

DISCUSSION

The purpose of this chapter has been to characterize a number of aspects of alcohol-related traffic accidents involving injury and/or death in B.C. in 1982. The approach taken has been to compare alcohol-related casualty traffic accidents with casualty traffic accidents that were not in any way related to alcohol, as recorded by the Traffic Accident Report Form (MV104). Therefore, these comparisons do not deal so much with the

TABLE 14-6

HORIZONTAL ROAD CHARACTERISTICS BY ALCOHOL INVOLVEMENT

Horizontal Road Characteristics	Total # Accidents	% Accidents where Driver(s) Drinking
Straight	12,718	17.7
Single Curve	2,740	26.4
Sharp Curve	957	24.5
Switchback	94	22.3
Winding Curves	359	22.8
Reverse Curve	19	21.1
Provincial Total	16,887	19.6%

Note: There were 7,375 missing cases

TABLE 15-6

VERTICAL ROAD CHARACTERISTICS BY ALCOHOL INVOVLEMENT

Vertical Road Characteristics	Total # Accidents	% Accidents where Driver(s) Drinking
Flat	10,947	19.3
Some Grade	4,899	20.4
Steep Grade	865	17.7
Provincial Total	16,661	19.5%

Note: There were 7,601 missing cases

TABLE 16-6

ROAD SURFACE BY ALCOHOL INVOLVEMENT

Road Surface	Total # Accidents	% Accidents where Driver(s) Drinking
Asphalt	22,075	19.6
Gravel	1,034	19.3
Other	289	17.3
Provincial Total	23,398	19.5%

Note: There were 864 missing cases

absolute number of alcohol-related accidents at different sorts of locations and so on, but rather with the relative proportion (i.e. percent) of these accidents in different locations. For example, as shown by Table 11-6, while there were more alcohol-related accidents in SNOW/SLEET than in FOG, there was a higher proportion of alcohol-related accidents in FOG compared to non-alcohol-related (19.1%) than there was during SNOW/SLEET conditions (9.5%). Thus, it must be remembered when considering the results of this report that the report is primarily dealing with proportions within accident condition categories, not with the overall frequencies of alcohol-related accidents.

Given the above limitation to this chapter, the alcohol-related casualty traffic accident is more likely than the sober driver casualty accident to have:

1. Been a single-vehicle accident where the driver lost control of the vehicle, ran off the road, and hit an object at the side of the road.
2. Occurred late in the week, late in the day, and in the Spring as opposed to the Winter.
3. Occurred on a more-or-less nondescript portion of the road, between intersections, with no traffic control devices in the immediate area (because none are needed). The land use in the area was likely to be a Family/Residential or an Agricultural/Undeveloped area, although campgrounds and recreational areas also had a high proportion (but low absolute number) of alcohol-related accidents. Posted speed zones did not show any particular patterns with regard to these sorts of accidents.
4. Occurred in high proportions in good driving weather and good road conditions and in low proportions in bad conditions and bad weather.

While high proportions of alcohol-related accidents were associated with "dark" (i.e. night) conditions, good ambient lighting did appear to reduce these proportions.

5. Occurred in curved road sections as opposed to straight sections, while road grade and surface composition did not appear to appreciably affect alcohol-related accidents.

The exceptional thing about the situational characteristics of alcohol-related casualty traffic accidents is that there are very few situational variables that can be pointed to in order to either explain or combat these accidents. It would seem that the drinking driver simply drives off the road when the road curves and hits an object off the road. The weather, road conditions, road surface, traffic control devices, posted speed zones, land use areas and so on are all either better than average for driving or make no particular difference one way or the other to the likelihood of the alcohol-related accident. Arguably, better lighting conditions and better barriers at road sides (especially at curves) might reduce these accidents, as might stronger enforcement efforts late at night, late in the week, and during the Spring. However, by elimination of the largely situational variables, one is left with the unavoidable conclusion that the primary precipitator and cause of these accidents is the inability of the driver to handle the vehicle after drinking. Unfortunately, the driver is the most difficult variable to change.

SECTION III

THE DRIVERS - ALCOHOL, AGE, EXPERIENCE

*Drunk VS Sober Drivers
*Driver Age and Experience

CHAPTER SEVEN

DRINKING DRIVERS VS SOBER DRIVERS: MOST FREQUENTLY CITED CONTRIBUTING FACTORS TO CASAULTY TRAFFIC ACCIDENTS BRITISH COLUMBIA 1982*

The chapter on Situational Characteristics of Alcohol-Related Casualty Traffic Accidents, B.C., 1982 concluded that:

> The exceptional thing about situational characteristics of alcohol-related casualty traffic accidents is that there are very few situational variables that can be pointed to in order to either explain or combat these accidents. It would seem that typically the drinking driver simply drivers off the road when the road curves and hits an object off the road. The weather, road conditions, road surface, traffic control devices, posted speed zones, land use areas and so on are all either better than average for driving or make no partaicular difference one way or the other to the likelihood of the alcohol-related accident. Arguably, better lighting conditions and better barriers at road sides (especially at curves) might reduce these accidents, as might stronger enforcement efforts late and night and late in the week, and during the Spring. However, by elimination of the largely situational variables, one is left with the unavoidable conslcusion that the primary precipitator and cause of these accidents is the inability of the driver to handle the vehicle after drinking. Unfortunately, the driver is the most difficult variable to change. (p.66)

The above conclusion still leaves a number of questions unanswered concerning the nature of alcohol-related traffic accidents. In particular, what specific driver-related, conditions-related and vehicle-related factors other than alcohol combined to produce the situation described above? For example, was the driver speeding? Was the vehicle neglected? Were there debris or rocks on the road? In short, what else besides alcohol contributed to the accident?

In order to begin to answer what contributing factors other than

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* The information presented in this chapter comes from the CounterAttack Brief Report #7, Ministry of Attorney General, July, 1982.

alcohol affect drinking drivers, one must not only examine all of the contributing factors associated with the drinking driver and his/her vehicle that went into the accident, but one must compare the frequency of occurrence of these other factors with their frequency of occurrence for drivers in accidents who have not been thought to have been drinking. In that way one can begin to understand what makes an alcohol-related traffic accident different from one that is not alcohol-related.

Consequently, it is the purpose of this chapter to compare drinking drivers in casulaty accidents with drivers who were not thought to have been drinking and who were in the same sort of accidents in terms of the Contributing Factors codes cited on the Traffic Accident Report Forms (MV104) in B.C. in 1982.

ANALYSES

From the B.C. 1982 MV104 reports involving casualties, driver/vehicle combinations where contributing factors were specified were divided into two groups: those driver/vehicle combinations where the driver was thought to have been drinking (N=4,670) and those where the driver was not thought to have been drinking (N=16,959). These two groups were then examined in terms of the number of times each contributing factor was cited as a percent of the number of driver/vehicle entities in the group.

The reasoning here is that by examining the percent of times contributing factors other than alcohol are cited for driver/vehicle entities where the driver was thought to have been drinking, one can determine what contributing factors in addition to alcohol influence the drinking driver. Further, by comparing this percent with the percent of times each contributing factor is cited for driver/vehicle combinations

where the driver was not thought to have been drinking, it can be determined how contributing factors associated with drinking drivers who are in casualty accidents differ from contributing factors associated with drivers who have not been drinking who were in casualty accidents.

RESULTS

Of the 21,629 driver/vehicle entities where contributing factors other than "does not apply" were noted for casualty accidents in B.C. in 1982, 21.6% involved drivers who were thought to have been drinking. Tables 1-7 through 3-7 on pages, 70, 71, and 72 illustrate the number of times each contributing factor was cited for these driver/vehicle combinations for both those where the driver was thought to have been drinking and those where the driver was not thought to have been drinking, grouped in terms of driver-related factors, conditions-related factors and vehicle-related factors respectively. In addition, these tables show the percentage of times each contributing factor was cited within each group.

Driver-Related Factors:

From the driver-related contributing factors displayed in Table 1-7, it can be seen that Driving Without Due Care is the most frequently cited additional contributing factor for drivers who were thought to have been drinking: it was cited for 48.0% of the drinking drivers as opposed to 29.8% of the drivers who were not thought to have been drinking.

Unsafe Speed, the second most frequently cited factor for alcohol-related driver/vehicle entities is similarly overrepresented when compared to other driver-vehicle combinations: it was cited for 27.3% of the alcohol-related driver/vehicle entities and for 16.4% of the not-alcohol-related driver/vehicle entities. Other driver-related

TABLE 1-7
DRIVER-RELATED CONTRIBUTING FACTORS

CONTRIBUTING FACTOR (PRIMARY OR SECONDARY OR TERTIARY)	ALCOHOL-RELATED		NOT ALCOHOL-RELATED	
	# TIMES CITED	% DRIVER/ VEHICLE	# TIMES CITED	% DRIVER/ VEHICLE
Alcohol Involvement	4,670	100.0	0	0.0
Driving Without Due Care	2,242	48.0	5,051	29.8
Unsafe Speed	1,276	27.3	2,786	16.4
Failure to Yield Right of Way	215	4.6	3,675	21.7
Traffic Control Device Ignored	208	4.5	1,203	7.1
Driving on Wrong Side of Road	207	4.4	589	3.5
Fell Asleep	150	3.2	321	1.9
Driver Inexperience	127	2.7	1,337	7.9
Following Too Closely	115	2.5	1,626	9.6
Turning Improper	80	1.7	634	3.7
Improper Passing	71	1.5	390	2.3
Pedestrian Error/Confusion	71	1.5	376	2.2
Extreme Fatique	46	1.0	168	1.0
Drugs (Illegal)	29	0.6	19	0.1
Cutting In	27	0.6	264	1.6
Backing Unsafely	25	0.5	214	1.3
Sudden Loss of Consciousness	11	0.2	70	0.4
Officer/Flagman/Guard Ignored	9	0.2	22	0.1
Suicide	8	0.2	20	0.1
Illness	4	0.1	61	0.4
Pre-existing Physical Disability	4	0.1	41	0.2
Prescribed Medication	3	0.1	18	0.1
Failure to Signal	3	0.1	74	0.4

TABLE 2-7
CONDITIONS-RELATED CONTRIBUTING FACTORS

CONTRIBUTING FACTOR (PRIMARY OR SECONDARY OR TERTIARY)	ALCOHOL-RELATED		NOT ALCOHOL-RELATED	
	# TIMES CITED	% DRIVER/ VEHICLE	# TIMES CITED	% DRIVER/ VEHICLE
Weather	198	4.2	2,980	17.6
Wild Animal	31	0.7	278	1.6
Obstruction/Debris on Road	24	0.5	281	1.7
Visibility Impaired	23	0.5	717	4.2
Tame Animal	19	0.4	174	1.0
Road Maintenance/ Construction	16	0.3	273	1.6
Glare - Artificial	4	0.1	59	0.3
Pavement Defective	2	0.0	134	0.8
Previous Traffic Incident	2	0.0	120	0.7
Glare - Sun	1	0.0	160	0.9
Sign Obstruction	0	0.0	19	0.1

TABLE 3-7
VEHICLE-RELATED CONTRIBUTING FACTORS

CONTRIBUTING FACTOR (PRIMARY OR SECONDARY OR TERTIARY)	ALCOHOL-RELATED		NOT ALCOHOL-RELATED	
	# TIMES CITED	% DRIVER/ VEHICLE	# TIMES CITED	% DRIVER/ VEHICLE
Tires Failure - Inadequate	29	0.6	228	1.3
Brakes Defective	20	0.4	265	1.6
Headlights Defective/ Out	20	0.4	78	0.5
Steering Failure	13	0.3	89	0.5
Accelerator Defective	4	0.1	40	0.2
Windshield Defective	3	0.1	6	0.0
Suspension Defective	2	0.0	16	0.1
Restraint System	2	0.0	9	0.1
Vehicle Modification	1	0.0	8	0.0
Engine Failure	1	0.0	58	0.3
Driverless	0	0.0	56	0.3
Brake Lights Out	0	0.0	24	0.1
Turn Signals Defective	0	0.0	32	0.2
Tow Hitch Failure	0	0.0	12	0.1
Oversize Vehicle	0	0.0	10	0.1

contributing factors that are overrepresented for alcohol-related driver/vehicle combinations are: Driving on Wrong Side of Road (4.4% vs 3.5%), Fell Asleep (3.2% vs 1.9%); Drugs (Illegal) (0.6% vs 0.1%); Officer/Flagman Guard Ignored (0.2% vs 0.1%); and Suicide (0.2% vs 0.1%).

Conditions-Related Factors:

As can be seen from Table 2-7, all conditions-related factors were underrepresented for alcohol-related driver/vehicle entities.

Vehicle-Related Factors:

As can been seen from Table 3-7, all vehicle-related factors with the exception of Windshield Defective (0.1% vs 0.0%) were underrepresented for alcohol-related driver/vehicle entities.

DISCUSSION

Before considering these results, it must be noted that the Contributing Factors on the Traffic Accident Report Form (MV104) are what the individual completing the form thought were the factors contributing tot he accident for that driver/vehicle combination. Arguably, some drinking drivers vehicle faults and so on went undetected. Nonethlesss, there is no reason to believe that one groups of drivers or type of accident is reported on in a different manner than another, and thus there are likely no systematic biases in these data when comparing Contributing Factors from the one group to the other.

Driver-Related Factors:

Clearly, Driving Without Due Care and Unsafe Speed are both overrepresented and frequently cited as Contributing Factors for drivers who were thought to have been drinking, while Driving on Wrong Side of Road and Fell Asleep are also overrepresented for this group, although not as

frequently cited in an absolute sense. On the other hand, those driver-related factors associated with the drivers' behaviour toward other vehicles (e.g. Failure to Yield Right of Way, Following too Closely) are underrepresented for drinking drivers.

This latter finding probably refects the high (58.0%) frequency of single-vehicle accidents for drinking drivers, as noted in Chapter Six.

It would seem that most often drinking drivers are both careless and speed, and because of this, are involved in accidents. The overepresentation of Fell Asleep as a Contributing Factor for these drivers likely has to do with the physiological depression caused by alcohol, while Driving on the Wrong Side of the Road also likely can be related to the decreased level of attention caused by alcohol.

Finally, it is interesting to note that the drinking driver involved in injury/death accidents is not necessarily the inexperienced driver, as Driver Inexperience was cited as a Contributing Factor more than twice as often for the sober as opposed to drunk drivers.

Conditions-Related Factors:

The finding that all conditions-related Contributing Factors are underrepresented for drinking drivers is upheld by the previously noted finding that for drinking drivers in casualty acccidents "The weather, road conditions, road surface...are all better than average..." (p. 66, Chapter Six).

Vehicle-Related Factors:

As the vast majority of the vehicle-related Contributing Factors were underrepresented for drinking drivers in casualty accidents, one can assume that the drinking driver does not particularly neglect his/her vehicle.

Conclusions:

From these results, one obtains the strong impression that drinking drivers in casualty accidents are, as a group, both personally and socially irresponsible: they become physically impaired and drive by choice and thus show their irresponsibility and contempt for the law; once driving, they are both careless and tend to speed, again showing personal and social irresponsibility. Certainly, the effect of the consumed alcohol reduces their ability to drive, but it can be argued that it is not the alcohol *per se* that is the really primary contributing factor, but rather the irresponsible personality that chooses to drink and drive, to drive carelessly, and to speed. In short, the problem rests at least as much with the individual's personality as it does with effects directly attributable to the physiological influence of the alcohol consumed.

CHAPTER EIGHT

AGE, DRIVING EXPERIENCE, ALCOHOL USE, AND CASUALTY TRAFFIC ACCIDENTS IN BRITISH COLUMBIA, 1982*

Clearly, the question of the relationship between alcohol-related traffic accidents and driver age is one that warrants attention[1]. In a recent study[2] by the Traffic Injury Research Foundation (T.I.R.F.) it was reported that young drivers drink less, drink and drive less, but are involved in more total crashes than are older drivers. However, the T.I.R.F. study also pointed out that these fatal crashes cannot be attributed to a single cause like alcohol, but rather are probably also due to inexperience, inadequate training, type and of condition of the vehicle, a tendency to take risks, inattention, and the fact that they drive more often at night than do older drivers.

Consequently, it is the purpose of this chapter to further pursue the contributions of drivers age, driving experience and alcohol use to traffic accidents. In particular, this chapter examines the 1982 British Columbia figures on all drivers involved in accidents producing injury and/or death, and whether or not they were thought to have been drinking at the time of the accident, as recorded on the Traffic Accident Report Form (MV104). It is hoped that by expanding the sample base from the T.I.R.F. base of only fatal crashes to the bases of all crashes involving injury or death, our understanding of the scope of this problem can be enhanced.

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* The information presented in this chapter comes from the CounterAttack Brief Report #10, Ministry of Attorney General, August, 1983.

1 At the annual conference of the British Columbia Medical Association, Kelowna, B.C., May, 1983, the recommendation to increase the drinking age from 19 to 21 years was presented and adopted. The primary motivation for this recommendation was to attempt to reduce alcohol-related traffic accidents among youth.

2 Mayhew, D.R. Age, Alcohol and Fatal Crash Risk. Ottawa: Traffic Injury Research Foundation, 1982.

ANALYSES

From the B.C. 1982 MV104 reports involving casualties, two variables were drawn: the age of each driver involved in the accidents, and whether or not alcohol was cited as a contributing factor to the accident for that driver. This information was then examined in order to gain some notion of the contribution of both age and drinking driving to traffic accidents. It should be noted that for 3,198 (8%) of the drivers either age or contributing factors were missing and therefore they were not included in the analyses.

In addition, driving experience was measured by examining drivers' licence numbers. This measure can be used because driving licences are issued from the Ministry of Transportation and Highways in Victoria consecutively, and thus licences bearing a lesser number were issued previous to those bearing a greater number. Unfortunately, only the past 7 years of records on driving licence numbers were available, and thus the sample that could be used only ranged from those drivers in casualty accidents from 17 years of age to those 22 years of age. On the other hand, limiting the sample age range to younger drivers reduces the sampling bias of persons coming into B.C. with extensive driving experience and receiving a B.C. driving licence with a recent issuance number.

Finally, because the local drivers' licence issuing offices may be issuing licences months after the licences were sent to them, drivers licence numbers can be only a rough measure of driving experience. Therefore the range of licence numbers used was simply divided into categories of Low Experience, Medium Experience and High Experience over the 7-year range of known licence numbers. Licences in the Low category were issued from Victoria to the regional offices after January 1981,

licences in the Medium category were issued after January 1979, and licences in the High category were issued after January 1977.

RESULTS

Age and Alcohol Use:

From Table 1-8 and Figure 1-8 on page 79 two things can be seen: first, that younger drivers are substantially overrepresented in accidents involving injury or death within the context of their age groups; and second, that younger drivers are substantially overrepresented in accidents involving injury or death where that driver was assessed to have been drinking.[4] Considering the relationship between driver age and accidents, provincially, in 1982 there were 39,942 drivers reported on the MV104 forms who had been in accidents producing casualties, and this represents 1.9% of the registered drivers in B.C. in 1982. However, the drivers in all age groups from 16 years to 25 years are above this average, with the highest figure being for the 16 year old age group at 6.4% - almost three times the average. In short, there is a pronounced decrease in the likelihood of being the driver in this sort of accident as driver age increases.

Indeed, if one were to subtract out all drivers who were thought to have been drinking (i.e. completely eliminate the possible effects of alcohol), one would still find that younger drivers were overrepresented in accidents producing injury or death. To illustrate, subtracting the percent of the total number of registered drivers in casualty accidents who were thought to have been drinking (right hand column, Table 1-8) from the percent of the total number of registered drivers who were in casualty accidents (second column from the right Table 1-8) gives the proportion of

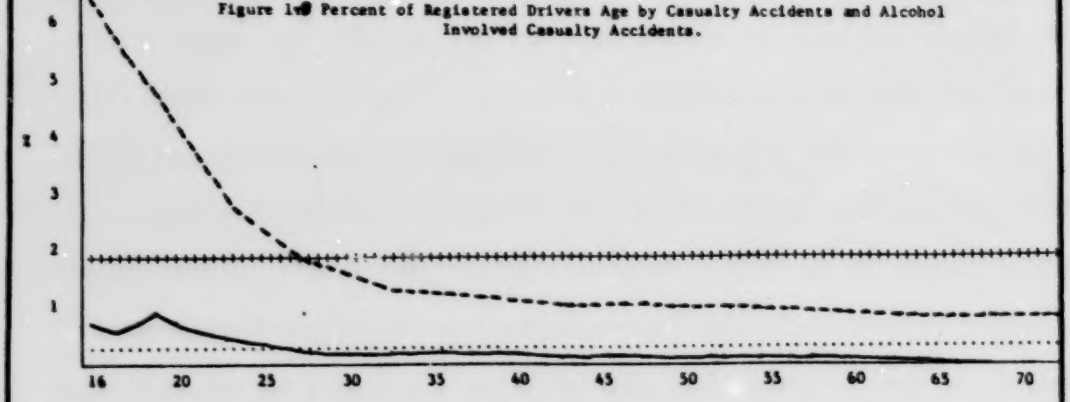
4 Mercer, G.W. The Characteristics of Night-Time Drivers in British Columbia. Vancouver: Ministry of Attorney General, 1982.

Table 1.8 Age by Registered Drivers, Casualty Accidents and Alcohol Involvement.

Age	Total # of Registered Drivers 1982	% of Total # That Were in Accidents Involving Injury or Death 1982	% of Total # That Were In Accidents Involving Injury or Death Who Were Thought To Have Been Drinking 1982
16	15,673	6.4	0.6
17	28,161	5.4	0.5
18	36,727	4.8	0.7
19	42,224	4.7	0.9
20	45,755	4.0	0.7
21-25	267,245	2.7	0.4
26-30	297,136	1.7	0.2
31-35	285,014	1.5	0.2
36-40	221,147	1.3	0.2
41-45	165,022	1.2	0.1
46-50	139,373	1.2	0.1
51-55	130,274	1.2	0.1
56-60	118,398	1.1	0.1
61-65	100,277	1.0	0.1
66-70	83,448	0.9	0.0
71-75	54,423	1.0	0.0
76-80	30,545	0.9	0.0
81+	19,127	0.8	0.0
Prov. Total	2,079,969	1.9	0.2

NOTE: Information was missing on 3,198 drivers.

Figure 1.8 Percent of Registered Drivers Age by Casualty Accidents and Alcohol Involved Casualty Accidents.



1. ---- % of Total Number of Registered Drivers That Were In Injury or Death Accidents (B.C., 1982)
2. —— % of Total Number of Registered Drivers That Were In Injury or Death Accidents Who Were Thought to Have Been Drinking (B.C., 1982).
3. ++++ Provincial Average of 1 above (1.9%).
4. .... Provincial Average of 2 above (0.2%).

drivers in each age group who were not assessed to have been drinking but were in a casualty accident. These figures are as follows:

Driver Age	%
16	5.8
17	4.9
18	4.1
19	3.8
21 - 25	2.3
26 - 30	1.5
31 - 35	1.3
36 - 40	1.1
41 - 45	1.1
46 - 50	1.1
51 - 55	1.1
56 - 60	1.0
61 - 65	0.9
66 - 70	0.9
71 - 75	0.9
66 - 80	0.9
80+	0.8
Provincial Average	1.7

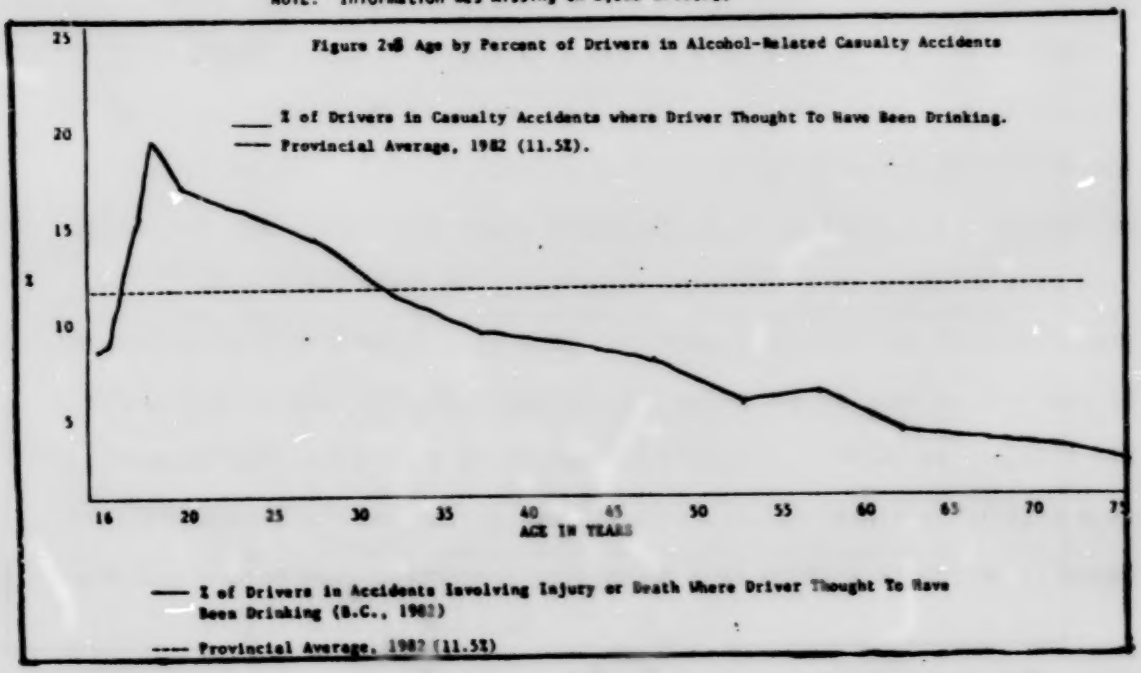
As can be seen from these figures, age is a very powerful predictor of accident involvement, even with the effect of alcohol removed.

Turning to the relationship between driver alcohol consumption and age within the context of casualty accidents, provincially 0.2% of the registered drivers in 1982 were in casualty accidents where they were thought to have been drinking (Table 1-8), which in turn comprises 11.5% of the drivers in casualty accidents (Table 2-8, page 81). The relationship between driver age and casualty accidents where that driver was thought to have been drinking is illustrated numerically in Table 2-8 and is graphically illustrated in Figure 2-8, page 81: drivers in the 16 year and 17 year old categories are below the average, with the peak at the 19 year old category at 18.9%. It should be emphasized that these figures do not show a strictly linear relationship between driver age and alcohol-related casualty accidents - there is a decreasing proportion both before and after

Table 2.8 Age by Casualty Accidents and Alcohol Involvement.

Age	Total # Drivers in Injury or Death Accidents, 1982	% Drivers in Accidents Involving Injury or Death Where Driver was Thought to Have Been Drinking 1982
16	1,000	8.9
17	1,517	9.5
18	1,781	15.6
19	1,996	18.9
20	1,828	17.1
21-25	7,203	16.5
26-30	5,080	14.2
31-35	4,199	11.5
36-40	2,839	10.5
41-45	2,023	9.8
46-50	1,616	8.2
51-55	1,526	6.6
56-60	1,352	7.3
61-65	1,001	4.7
66-70	779	3.9
71-75	531	3.4
76-80	284	1.4
81+	144	0.7
Prov. Total	36,699	11.5

NOTE: Information was missing on 3,198 drivers.



the legal drinking age of 19, with a peak at that age.

Finally, both Table 1-8 and Figure 1-8 show that, while drivers' alcohol use certainly contributes to the overall proportion of contributing factors, there is still much to be discovered. For example, if we know that 18.9% fo the 18 year old drivers were thought to have been drinking, this also means we have not determined the contributing factors for the remaining 81.1% of the 18 year old drivers.

Effects of Driving Experience:

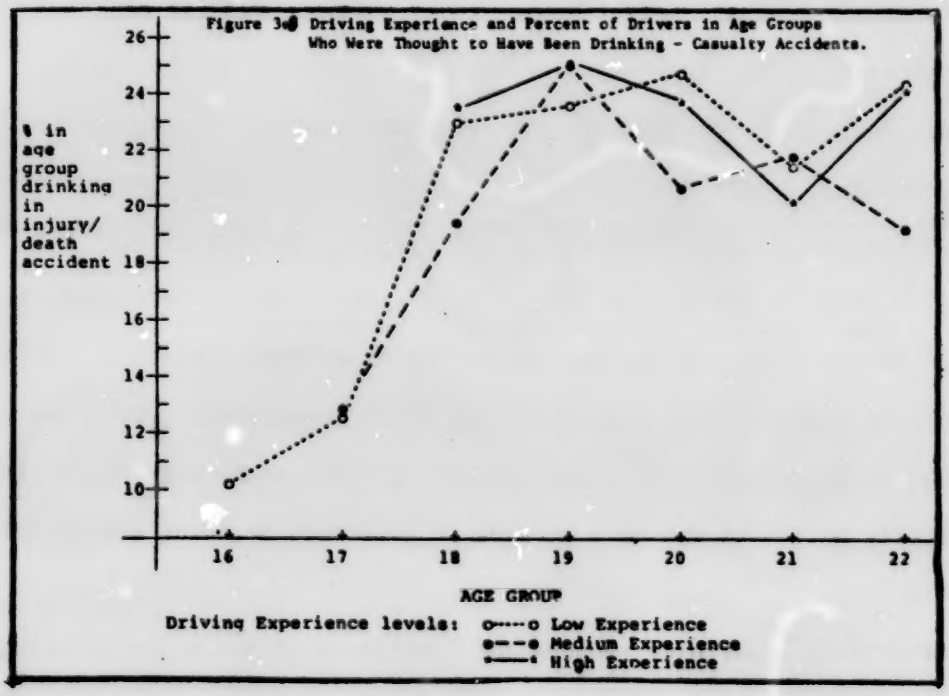
Table 3-8 on page 83, illustrates the number of persons in each driving experience category for each age group, as well as the percentage within each age/experience group that were thought to have been drinking. It should be noted that, due to computer limitations only the MV104 "Driver Number 1" codes were used, and as there is a strong tendency for drinking drivers to be coded as "Driver Number 1" in multiple vehicle accidents, the proportions of drinking drivers for the age/experience categories is somewhat inflated. Nonetheless, the relative relationships across the Low, Medium and High experience categories within each age group should not be unduly affected by this limitation. For example, for the 17 year old group, if both "Driver 1" and "Driver 2" 17-year-olds had been used, the percent drinking in both the Low and Medium experience categories would probably be somewhat less than 12.2% and 12.7% respectively, but they would still be roughly equal (the actual overall percent of 17 year old drivers in casualty accidents who were thought to have been drinking can be found in Table 2-8).

If driving experience reduced the likelihood of being the drinking driver in an alcohol-related casualty accident, then one would expect that, within each age category, those in the High experience category would have

Table 3.8 Age by Driving Experience and Alcohol-Involved Casualty Accidents.

Driver Age Group[1]	Low Driving Experience		Med. Driving Experience		High Driving Experience		Overall % Drinking
	Total Number	% Drinking	Total Number	% Drinking	Total Number	% Drinking	
17 years	337	12.2	600	12.7	0	0.0	12.4
18 years	183	22.9	801	19.1	117	23.1	20.2
19 years	206	23.3	501	24.7	546	24.7	24.5
20 years	144	24.3	245	20.4	721	23.3	22.8
21 years	121	23.1	166	23.5	741	19.8	20.8
22 years	96	24.0	115	19.1	705	23.7	23.1

1 Note: These figures are based on the "Driver Number 1" MV104 codes for injury/death accidents. All drivers within each age group were not used due to computer limitations. The use of only "Driver Number 1" inflates the proportion of drinking drivers in each age category due to the tendency to record a drinking driver as "Driver Number 1" in a multiple vehcile accident.



fewer accidents then those in the Medium category who in turn would have fewer than those in the Low driving experience category. However, from Table 3-8 it can be seen that the proportions of drinking drivers in accidents within each experience category for each age group are all roughly similar. For example, 12.2% of the 17 year-olds in the Low experience category were drinking and had a casualty accident, while 12.7% in the Medium experience category were drinking and had such an accident. Indeed, in a number of age groups, drivers in the High experience category had proportionally more alcohol-related accidents than did those in the Low experience category.

Figure 3-8 on page 83, graphically illustrates the consistent proportions of drinking drivers in casualty accidents within age groups. From this figure it can clearly be seen that drinking driving varies in terms of age categories rather than in terms of driving experience. That is, for any of the age groups examined (16-22 years), the person just learning to drive has as much chance of being the drunk driver in a casualty accident as does the person with more driving experience.

DISCUSSION

Before discussing the findings of this chapter, some cautionary notes are necessary: it must be kept in mind that these data are what was reported, not necessarily what was true in the absolute sense. For example, the attending police officer will indicate that alcohol was a contributing factor if, in his/her judgement the driver had been drinking. Arguably, the officer could be misled by a driver who appeared sober but in fact had been drinking. Thus, these figures could well underrepresent the actual number of drinking drivers. On the other hand, there is no

particular reason that an officer would incorrectly assess alcohol as a contributing factor for one age group over another age group, and therefore while the absolute number may have some error factor, their relative ranking should not.

To a great extent these findings support the previously cited T.I.R.F. study, as both studies found that younger drivers are more likely to be in accidents in general and alcohol-related accidents in partiuclar than are older drivers. Additionally, the CounterAttack night-time driver survey[4] also supports the T.I.R.F. finding that young drivers drink and drive less than do older drivers. From this, it follows that the young drinking driver is particularly at risk.

Further, the fact that the highest relative proportion of alcohol-associated casualty accidents is found in the 19 year old driver category, and that this is also the age at which one can first legally drink in British Columbia, suggests a causal relationship between the two. However, how one might address the double problems of young drivers in accidents and young drivers in alcohol-related accidents is one that merits careful consideration and is largely beyond the scope of this chapter. Indeed, the purpose of this chapter has been only to report on the relationships among age, driving experience, alcohol use, and traffic accidents within the context of the current 1982 sample of drivers in casualty accidents in B.C., and from the data reviewed no firm conclusions can be drawn as to what ought to be done in order to reduce the frequency of these accidents.

Nonetheless within the context of the variables and age groups

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4 Mercer, G.W. The Characteristics of Night-Time Drivers in British Columbia. Vancouver: Ministry of Attorney General, 1982.

examined, these data clearly illustrate that age alone is the best predictor of the likelihood of being in a casualty traffic accident and that legal access to alcohol is the best predictor of alcohol-related crash risks, while years of driving experience do not relate in any systematic fashion to alcohol-related crash risks. Two things follow from this: First, further restricting access to alcohol would probably reduce alcohol-related accidents for that group affected, and would also probably marginally reduce the absolute number of accidents. Second, limiting driving privileges for younger drivers would substantially reduce both alcohol-related and non-alcohol related accidents both for the age group affected and for the population generally, as age is the very best overall predictor of crash risks. On this latter point, as the T.I.R.F. study found that younger drivers are more likely than older drivers to be on the road at night, and as this is the most dangerous time to be driving, perhaps the notion of restricting driving privileges to daylight hours for these drivers merits consideration.

SECTION IV

OVERVIEW, CONCLUSIONS AND RECOMMENDATIONS

CHAPTER NINE

OVERVIEW, CONCLUSIONS AND RECOMMENDATIONS

The Costs:

Within the last six and one half years in British Columbia at least one thousand, six hundred and thiry-one people have been killed and forty-six thousand, seven hundred and thirty-nine have been injured in traffic accidents caused primarily by drinking drivers. In 1982 alone, accidents associated with drinking driving cost the provice at least one hundred and four million dollars in insurance claims, medical claims and Justice System costs. Regarding the burden on the Justice System, in 1982, about 30% of the persons charged by the police under the Canadian Criminal Code, 30% of the completed Criminal Code cases in the courts, and 34% of the admissions to correctional institutions were Driving While Impaired charge related. Arguably, drinking driving extracts more costs from society than does any other single behaviour.

Measurement and Trends:

Problems in the measurement of the contribution of alcohol to traffic accidents involve the same two dimensions that are associated with the measurement of any phenomenon - reliability and validity. For a measure to be of any use it must first be reliable, that is, the measurement must be performed in the same way using the same measuring instrument under the same circumstances every time. Once a measure has been shown to be reliable, it then must be considered in terms of its validity - does it really measure what it is intended to measure?

In British Columbia the Traffic Accident Report Form (MV104) has been completed since 1977 at all casualty traffic accidents by the attending

officer. This form allows the designation of up to three separate factors contributing to the accident per driver/vehicle combination, and these factors are ranked in order of importance (primary,secondary, tertiary - see Appendix C), with Driver #1 generally being considered as having the greatest responsibility for the accident where there is more than one driver/vehicle combination involved. Further, the primary contributing factor for Driver #1 is almost invariably completed by the attending officer at these casualty accidents. Thus, the MV104 indication of the primary cause of a casualty accident is a reasonably reliable measure, as it has been completed in the same manner (attending officer) under the same circumstances (casualty accident), using the same form since 1977.

While the use of the primary contributing factor for Driver #1 may make the measurements reliable, it is questionable that it gives a completely accurate assessment of the accident causes. This question of the validity of the use of Driver #1 Factor #1 for these casualty accidents comes from the lack of accuracy of the attending officer. It is very likely that in a number of instances the attending officer is in error regarding both the primacy of the cause (i.e. was the primary contributing factor indicated really primary?) and the identification of certain causes at any level (e.g. it is likely that many instances of, say, alcohol involvement or vehicle fault are underestimated due to the difficulty of detecting either).

Certainly, examining all of the contributing factors to the accident elmininates the problem of the primacy of the factors, but this is only appropriate for cross-sectional studies, as the number of factors cited increased from year to year as the police became more familiar with the

MV104. Therefore, when using the MV104 to compare variables within the same time frame, all contributing factors should be assessed, while the examination of trends within contributing factors should use only Driver #1, Factor #1. Finally, although there is little that can be done about the probability of the underreporting of some factors (e.g. Alcohol Involvement, Vehicle Fault) and the overreporting of other factors (e.g. Driving Without Due Care), one can at least assume that these factors are under and over reported reasonably consistently.

From the above, it follows that the Traffic Accident Report Form (MV104) information on casualty accidents is an acceptably reliable and qualifiedly valid source of information on the nature of and trends in these accidents in British Columbia. (See also Chapter 2, Chapter 3, pages 24 to 28, and Chapter 4, pages 31 to 33.

Turning to some substantive findings, in 1982 in British Columbia the twelve most frequently cited contributing factors to casualty accidents, as indicated by the factors noted on the MV104 reports, were: Driving Without Due Care - 16.2% of the drivers; Alcohol Involvement - 11.5% of the drivers; Unsafe Speed - 10.0% of the drivers; Failure to Yield Right of Way - 9.6% of the drivers; Weather - 7.9% of the drivers; Following too Closely - 4.3% of the drivers; Driver Inexperience - 3.6% of the drivers; Traffic Control Device Ignored - 3.5% of the drivers; Driving on Wrong Side of Road - 2.0% of the drivers; Improper Turn - 1.8% of the drivers; Improper Passing - 1.1% of the drivers; and Pedestrian Error - 1.1%.

When considering contributing Factor #1 only, the relative frequency of cited factors changes dramatically: For example, Driving Without Due Care is indicated for only 8.6% of the drivers as Factor #1, but is indi-

cated for 16.2% of the drivers as Factor #1 or 2 or 3. Similarly, Unsafe Speed drops from 10.0% of the drivers when considered as any of the three factors to only 3.8% of the drivers when considered as only factor #1, while Failure to Yield drops from 9.6% to 7.3% and Alcohol drops from 11.5% to 10.0%. Clearly, the examination of only the first noted contributing factor can give a distorted picture of the epidemiology of casualty traffic accidents (see Table 5-3, page 21). In particular, the examination of all contributing factors ranks Driving Without Due Care as the most frequently cited contributing factor to casualty traffic accidents and ranks Alcohol, Speeding, and Failure to Yield all about tied for second place.

Unfortunately, as noted earlier, contributing factor #1 only must be used to examine casualty accident causes from 1977 onward, due to changes in the number of factors noted by the police over time. However, using driver #1 and eliminating all those accidents where Weather was cited as factor #1 for Driver #1, it would appear that the proportion of alcohol-related casualty traffic accidents has remained more-or-less stable for the past 3 1/2 years, and that that level represents about a 10% reduction in these sorts of accidents from 1977 levels (see Figure 2-4 page 35). Considering that the likelihood of being charged with Driving While Impaired has decreased since 1977, yet the proportion of alcohol-related accidents has not recently increased, one can speculate that it is the perception of a high likelihood of apprehension has kept drinking-driving under control. One can further speculate that the CounterAttack program of public education has contributed to maintaining a high fear of apprehension while the actual likelihood of apprehension has been decreasing since 1977. This notion is supported by the fact that both the proportion and

absolute number of alcohol-related casualty accidents reduces subtantially in the December-Januay period, which is when groups like CounterAttack make their strongest appeal to the public. Finally, the highest proportion of alcohol-related casualty traffic accidents appear to occur in the Spring and early Summer.

In sum Section I on the measurement of and trends in factors contributing to casualty traffic accidents suggests that:

1. Measurement of the causes of these accidents is difficult at best, but using the contributing factor codes from the Traffic Accident Report Form (MV104) completed by the attending officer at all casualty accidents is reasonably reliable and an acceptably valid approach.
2. An examination of all contributing factors to these casualty accidents reveals that Driving Without Due Care is the most frequently cited factor, with Alcohol Involvement, Unsafe Speed and Failure to Yield Right of Way all at about the same level as the second most frequently cited factors.
3. Since 1977 the proportion of alcohol-related casualty accidents has decreased by about 10% and has been stable for the past three years, while the actual likelihood of being charged with Driving While Impaired has decreased from 1977 levels.
4. Alcohol-related casualty traffic accidents show seasonal variations, being least frequent in December-January and most frequent in the Spring and Summer.

Location and Circumstances:

Not surprisingly, the first chapter in Section II on the location and circumstances of alcohol-related casualty traffic accidents illustrates that the contributing factors associated with these accidents vary with the general driving environment - in municipal areas Failure to Yield the Right

of Way and Following too Closely are cited more frequently than in more rural areas, while in the rural areas Alcohol Involvement, Unsafe Speed and Weather are cited more frequently than in municipal areas. Additionally, Following too Closely is cited as a contributing factor frequently on freeways, while Driving Without Due Care is cited with about the same frequently in municipal as in rural areas.

To elaborate, it seems reasonable to assume that in municipal areas there is a higher density of both traffic and road curves and corners than in rural areas, and therefore Following Too Closely and Failure to Yield would be cited relatively frequently. (Following too Closely is also probably related rush-hour high traffic density on freeways.) On the other hand, in the more open rural areas vehicles have more of an opportunity to build up speed, thus increasing the contribution of Speeding to casualty accidents in these areas. Considering the weather, while it clearly does not differ between a municipal areas and its urban periphary, the extent of artifical lighting and the grooming of the roadways are both aspects that are less in rural areas than in municipal areas and both reduce the danger of bad-weather driving, thereby decreasing Weather as a factor in municipal areas over rural reas. Regarding Driving Without Due Care, careless drivers appear not to be concentrated in any particular areas, as this factor is cited with about equal frequency in rural and municipal casualty accidents. Finally, while Alcohol is cited as a contributing factor more frequently in rural than in municipal areas, it must be remembered that although the casualty accident may have occurred in a rural area, the

origin of the alcohol consumption was most likely to have been in a municipal area.

Turning from the general geographic location of casualty traffic accidents to a more detailed examination comparing alcohol-related casualty accidents to non-alcohol-related casualty accidents, Chapter Six shows when compared to the non-alcohol related accident, alcohol-related accidents were more likely to have:

1. Been a single-vehicle accident where the driver lost control of the vehicle, ran off the road, and hit an object at the side of the road.
2. Occurred late in the week, late in the day, and in the Spring as opposed to the Winter.
3. Occurred on a more-or-less nondescript portion of the road, between intersections, with no traffic control devices in the immediate area (because none are needed). The land use in the area was likely to be a Family/Residential or an Agricultural/Undeveloped area, although campgrounds and recreational areas also had a high proportion (but low absolute number) of alcohol-related accidents. Posted speed zones did not show any particular patterns with regard to these sorts of accidents.
4. Occurred in high proportions in good driving weather and good road conditions and in low proportions in bad conditions and bad weather. While high proportions of alcohol-related accidents were associated with "dark" (i.e. night) conditions, good ambient lighting did appear to reduce these proportions.
5. Occurred in curved road sections as opposed to straight sections,

while road grade and surface composition did not appear to appreciably affect alcohol-related accidents.

The exceptional thing about the situational characteristics of alcohol-related casualty traffic accidents is that there are very few situational variables that can be pointed to in order to either explain or combat these accidents. It would seem that the drinking driver simply drives off the road when the road curves and hits an object off the road. The weather, road conditions, road surface, traffic control devices, posted speed zones, land use areas and so on are all either better than average for driving or make no particular difference one way or the other to the likelihood of the alcohol-related accident. Arguably, better lighting conditions and better barriers at road sides (especially at curves) might reduce these accidents, as might stronger enforcement efforts late at night, late in the week, and during the Spring. However, by elimination of the largely situational variables, one is left with the unavoidable conclusion that the primary precipitator and cause of these accidents is the inability of the driver to handle the vehicle after drinking. Unfortunately, the driver is the most difficult variable to change.

The Drivers - Alcohol, Age, Experience:

Turning to the drivers in casualty traffic accidents, one finds that the factors contributing to the accident differ between sober drivers and those drivers who were thought to have been drinking. Dealing with driver-associated contributing factors, from Chapter Seven it can be seen that drinking drivers have Unsafe Speed, Driving Without Due Care, Driving on Wrong Side of Road and Fell Asleep cited as contributing factors to

casualty accidents more often than do sober drivers, while they have factors associated with their behaviour toward other drivers (e.g. Failure to Yield Right of Way, Following too Closely) cited less frequently than for sober drivers. This latter finding probably reflects the high (58.0%) frequency of single-vehicle accidents associated with alcohol, as noted in Chapter Six. Further, Driver Inexperience is cited less frequently as a contributing factor for drivers who were thought to have been drinking than for those who were thought to be sober.

The finding noted in Chapter Six that alcohol-related accidents do not seem to be associated with adverse environmental conditions (e.g. rain, fog, etc.) is supported by the finding in Chapter Seven that conditions-related contributing factors are underrepresented in casualty accidents involving drivers who were thought to have been drinking. Further, not only can the drinking driver not pass off the responsibility for the accident on the driving conditions, that driver also cannot blame the vehicle condition, as the majority of vehicle-fault factors are underrepresented for drinking drivers in casualty accidents.

Thus, from the findings in Chapter Seven one obtains the strong impression that drinking drivers in casualty accidents are, as a group, both personally and socially irresponsible: they become physically impaired and drive by choice and thus show their irresponsibility and contempt for the law; once driving, they are both careless and tend to speed, again showing personal and social irresponsibility. Certainly, the effect of the consumed alcohol reduces their ability to drive, but it can be argued that it is not the alcohol per se that is the really primary contributing factor, but rather the irresponsible personality that chooses to drink and

drive, to drive carelessly, and to speed. In short, the problem rests at least as much with the individual's personality as it does with effects directly attributable to the physiological influence of the alcohol consumed.

With regard to the relationships among driver age, driver experience, and alcohol-related casualty accidents, Chapter Eight shows that: 1) More than any other factor examined driver age contributes most to the likelihood of being in a casualty accident. That is, the younger the driver, the more probably the driver will be in a casualty accident: 2) The highest relative proportion of registered drivers in alcohol-related casualty accidents occurs in the 19-year old group, with this proportion decreasing for both younger and older drivers. As 19 years of age is the first time persons in B.C. can legally acquire alcohol, there may be a causal relationship between this legal access and alcohol-involved accidents; 3) For the 16-22 year old group of drivers, extent of driving experience did not relate systematically to being in an alcohol-related casualty accident.

From these findings one concludes that age alone is the best predictor of crash risks and that legal access to alcohol is the best predictor of alcohol-related crash risks, while years of driving experience do not related in any systematic fashion to alcohol-related crash risks.

Recommendations:

From Section 1 on the measurement of and trends in alcohol-related casualty traffic accidents, one can recommend that:

1) While public education programs such as CounterAttack are doing a fair job of keeping the problem of drinking drivers under control, and

indeed work quite well during the "blitz" Winter times, more effort needs to be put into education and enforcement at peak alcohol-related accident time of early Spring and Summer; and

2) It would be worthwhile to broaden public education and enforcement campaigns to include speeding and failure to yield.

Broadly speaking, from Section II on the location and circumstances of these accidents, two recommendations can be taken:

1. Enforcement Resources and public education efforts need to be distributed in terms of the types of contributing factors associated with different locations. For example, it would make more sense to increase enforcement on Failure to Yield (provincially cited in 16% of the accidents) in the Vancouver area (locally cited in 23% of the accidents) than to crack down on Following too Closely (provincially cited in only 7% of the accidents) in the Prince Rupert area (locally cited in only 3% of the accidents).
2. As it seems to be the driver not the circumstances that precipitates alcohol-related casualty accidents, then a focus on the driver and driver education would seem to be the route to take in order to reduce these accidents.

From Section III on the drivers, it seems reasonable to suggest that while further restricting access to alcohol would probably reduce alcohol-related accidents for that group affected, and would also probably marginally reduce the absolute number of accidents, a more effective approach to reducing young driver traffic accidents would involve limiting driving privileges for younger drivers. This would substantially reduce both alcohol-related and non-alcohol related accidents both for the age

group affected and for the population generally, as age is the very best overall predictor of crash risks.

Finally, while there is much still needed to be done, it should be remembered that some few inroads have been made toward reducing alcohol-related casualty accidents in British Columbia. To place the reduction of these accidents noted in Chapter Four into perspective, if one assumes that in each year from 1977 alcohol-related casualty accidents have been no more than 90% of the frequency that one might expect had there been no prevention programs, then one can calculate that between 1978 and 1982 inclusive, 146 deaths and 4,246 injuries have been avoided, which translates into a cost saving of about $43,920,000 to the Insurance Corporation of British Columbia alone, based on the I.C.B.C. cost estimate of $10,000 per injury or death.

APPENDIX A

A Summary of

THE CHARACTERISTICS OF NIGHT-TIME DRIVERS IN BRITISH COLUMBIA *

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* Mercer, G.W. British Columbia: Ministry of Attorney General, 1982
(ISBN 0-7719-9133-9)

EXECUTIVE SUMMARY

"Characteristics of Night-Time Drivers in British Columbia"

This report provides a summary of the analysis of information gathered in a night-time roadside survey of 7,380 persons driving in the Spring of 1981, in British Columbia. The survey was directed by the research section of Counter-Attack on behalf of the Motor Vehicle Task Force.

The survey collected data on seat belt use; driver blood alcohol content; place of alcohol consumption; vehicle type. Questions were asked on distance driven; chief cause of accidents; would they call police if they saw a drinking driver.

Over 94% of the drivers voluntarily and successfully provided information and breath samples for analysis. A summary of the results follows.

Drivers' Blood Alcohol Content (BAC)

Of the 6,944 drivers tested in this survey, 6.1% were legally impaired as defined by the Criminal Code of Canada (i.e. over .08%); a total of 12% were over .05% (i.e. impaired to an unsafe level under British Columbia law); 88% had a BAC between .00% and .05%.

The profile of the impaired driver which emerges from the study is of a male under fifty years of age, who had been drinking at licensed premises, not wearing a seat belt, having passengers in the vehicle, on a journey of 5 miles or under, and holding the view that speed or some cause other than alcohol was the primary contributor to traffic accidents. He and his like are driving more often on days closer to the weekend, later at night, and especially on Saturday night and the early hours of Sunday morning.

From the survey of all the drivers tested:

- 12% of drivers were impaired in terms of criminal and British Columbia law.
- Males were twice as likely to be impaired than were females; 7% of males and 3.5% of females were legally impaired; 13.4% of males and 7.8% of females were over .05% BAC.
- Drivers over fifty years of age were much less likely to be impaired than were younger drivers; 2.7% of those over sixty years old and 3.7% of those fifty to fifty-nine years old were legally impaired whereas 7.1% aged forty to forty-nine years; 6.3% twenty-five to thirty-nine years; 6.8% twenty to twenty-four years; 5.8% sixteen to nineteen years were legally impaired.

- Impaired drivers were more than twice as likely not to be wearing seat belts compared to drivers not impaired.

- 16.3% of those who had been drinking in licensed premises were legally impaired, while 10.8% of those drinking elsewhere were legally impaired.

- 5.1% of drivers legally impaired cited alcohol as the chief cause of traffic accidents, while 7.3% of those legally impaired cited causes other than alcohol.

- 10.7% of drivers without passengers were over 0.5% BAC, while 20% of drivers with 3 or more passengers were over .05% BAC.

- The later in the night, the greater the proportion of impaired drivers on the road. The proportion of drivers over .08% BAC increases from 2.6% between 9 and 10:30 p.m. to 14.4% between 1:30 and 3 a.m. At the .05% BAC level the proportion rises from 5.3% betwen 9 and 10:30 p.m. to 25.3% between 1:30 and 3 a.m.

- The drinking driving rate rises each night from Wednesday through Saturday. 7.8% of drivers on Wednesday night are over .05% BAC, while on Saturday night the proportion rises to 15.1%.

- 73.6% of the legally impaired drivers were on trips of under 16 miles.

- 83% of drivers surveyed were in cars, 13% were in trucks, mainly pick-ups.

- 5.6% of car drivers and 5.9% of truck drivers were legally impaired. (Heavy commercial vehicles were not included in survey.)

Seat Belt Use

Of the 7,380 drivers who were interviewed, 59.5% of the drivers and 50.2% of the passengers were wearing seat belts.

Driver seat belt use was related to:

- Time - the lowest usage was from 1:30 - 3 a.m. (49.9%); highest usage was between 9 and 10:30 p.m. (61.3%).

- Distance - highest use (99.7%) on trips longer than 100 miles.
- Sex - females wore seat belts more than males (67.9% compared to 54%).
- Age - the older the person, the more likely they were to be wearing seat belts (49% of wearers were sixteen to twenty-four years old; 75% were over sixty years of age).
- Blood Alcohol Content - 63.4% of legally impaired drivers were not wearing seat belts.

Opinion and Attitudes

Two questions were asked with results as follows:

- 57.6% of sixteen to twenty-four year olds cited alcohol as the chief cause of motor vehicle crashes, whereas 41% in the sixty-plus age group gave this opinion.
- Overall 52% gave alcohol as the chief cause of crashes; 13% cited speeding; and 34% gave other causes.
- 73.4% of drivers said they would call the police if they saw a drunk driver. This question was asked primarily to test the reach and effectiveness of the recent CounterAttack information campaign;

"If you see a drinking driver... please, phone the police." Of the sixteen to twenty-four year olds, 71.7% indicated 'yes'; 90.1% of the sixty-plus year olds gave a 'yes' answer.

General Conclusions

The profiles of night-time drivers in British Columbia that emerge from such studies have value to both preventative and enforcement program planners. This study is particularly useful in that it largely replicates a similar survey undertaken in the province in 1974, and thus allows for an assessment of change over a period of time.

Comparing the findings between the 1974 and 1981 surveys, it was found that;

- There has been no statistically significant increase in drinking and driving levels.
- Over this time period non-traffic Criminal Code charges have increased, while drinking driving Criminal Code charges have remained stable.
- Alcohol consumption has increased in the province slightly during this time, but the likelihood of being killed in an alcohol-related crash has slightly decreased.

APPENDIX B

A Summary of

DRIVING WHILE IMPAIRED: DRIVERS, CHARGES, AND OUTCOMES *

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* Mercer, G.W. British Columbia: Ministry of Attorney General, 1983
(ISBN 0-7719-9196-7)

Executive Summary

Police and court records of all legally impaired drivers charged in 1980 (N=1,531) in 12 RCMP detachments on Vancouver Island were examined and the results of this examination are as follows:

DRIVER AND VEHICLE CHARACTERISTICS

Comparing the apprehended and charged drivers with the characteristics of the legally impaired driver population (Mercer, 1983) the apprehended and charged drivers, like the legally impaired driver population as a whole, tend to be male (89.7%), under 50 years of age (85.1%), coming from a bar (71.3%), and are driving a car (70.1%). Also, like the legally impaired population, they are found most frequently later in the week (26.6% on Saturdays and only 5.8% on Mondays) and later in the evening (49.1% between 2200-0159 hours and only 1.6% between 0600-0959 hours).

In addition, the apprehended drivers are most likely to be single (49.4%), have had more than one previous non-criminal driving violation (61.0%), and be driving a vehicle over 7 years old (66.0%). Finally, 24.0% have had previous Driving While Impaired (DWI) convictions.

From the comparison of the characteristics of this sample with the general characteristics of impaired drivers in British Columbia, it appears that the police are doing a good job in terms of apprehending and charging a representative cross section of impaired drivers with one exception: those drivers with a very high BAC are overrepresented in the apprehended and charged group. Regarding this latter point, only about 1% of the legally impaired drivers on the road have a BAC of 181+ mg./100 ml., while 31% of those apprehended have a BAC over 180 mg./100 ml. On the other hand, the drivers in this study's highest BAC category (181 + mg./100 ml.) have a 77 times

greater chance of being apprehended than those in the lowest BAC category (80 - 140 mg./100 ml.).

CHARGES AND OUTCOMES

Considering ways that drivers were stopped and charged, 53.2% were stopped on a "routine check", probably because they were exhibiting some driving behaviour that brought them to the attention of the officer, 22.8% were in accidents, 5.0% were stopped and charged at roadblocks, 10.2% were reported by the public, and 8.8% were stopped on some other charge (e.g. faulty lights).

The evidence presented to the courts by the police and Crown seems to be extremely effective, as fully 87% of those charged with one or more offence under Section 234 (driving while impaired), 235 (refusal to blow), and/or 236 (BAC of 80 +mg./100 ml.) were found or pleaded guilty on one or more charges (the provincial figures for these guilty dispositions in 1980 was 84%). The general pattern was: to be charged under both Sections 234 and 236 (75.2%) or under both Sections 234 and 235 (13.0%); to be given a stay of proceedings on one charge; and to be found or plead quilty on the second charge. This is in line with the Keinapple vs the Queen (1974) decision which essentially states that one cannot have multiple convictions on the same offence. Very few drivers were charged under Section 234 only (1.4%) or under Section 236 only (0.8%). Finally, only 11.0% of the sample actually went to trial, and of these, 67.5% were found guilty on one or more counts.

Those charged under both Sections 234 and 236 show a greater tendency (90%) to plead guilty (and thus save court time and costs) then do those charged under both Sections 234 and 235 (70%). It follows that the evidence of a blood alcohol reading (BAC) has an important psychological impact on the accused.

RECIDIVISM

Comparing the 24% of the apprehended drivers who had previous convictions under Sections 234, 235 and 236 with those who had no previous DWI charges, one finds that the recidivists were likely to be male and were likely to have an unusually high BAC, with 31% of those in the highest BAC group having had previous DWI convictions and only 12% of those in the lowest BAC group having had previous DWI convictions. From this, one suspects that these recidivists are consistently heavy drinkers who often drive while impaired. That is, if the chances are slight of being caught when driving while impaired, they are extremely slight of being caught twice or more, and therefore it is likely that the recidivists frequently drive while impaired.

Regarding non-criminal driving convictions, the high BAC group does not appear to consist of a particularly bad set of drivers, as when they are compared to the lower BAC groups they have generally fewer non-criminal driving convictions. However, they do tend to be overrepresented in the 41-60 year old group and in the separated, divorced, and widowed group. Further, they are overrepesented in the group of drivers apprehended during the daylight hours.

From the above, one derives a picture of a male, middle-aged chronic drinker with an unstable or non-existent family life who is not responding to the current sanctions imposed by the court. This person drinks and drives and will continue to do so until he is unable to do the one or the other. Being in the very high BAC group he is amongst the most dangerous drinking drivers on the road, and he is the one least likely to change his habits, as evidenced by his recidivist status.

ACCIDENT INVOLVEMENT

From the comparison of those apprehended drivers involved in accidents with those apprehended drivers not involved in accidents, it is noteworthy that there were no differences between the two groups, at least in terms of the variables examined. It would appear that factors other than age, sex, marital status and so on are critical in predicting those who will be involved in accidents. On the other hand, comparing the BAC of those in accidents with the BAC norms for the province as a whole, those in the highest BAC group (180+ mg./100 ml.) have about a one in eighteen or 63 times greater chance of being in an accident than those in the low group (80 - 140 mg./100 ml).

RECOMMENDATIONS

1. The police are doing a good job of apprehending a representative cross-section of drinking drivers, but the proportion of drinking drivers apprehended is quite small, especially among those legally impaired drivers with a relatively low BAC. It is therefore recommended that more use be made of random spot checks and roadblocks, possibly with mandatory ALERT type BAC testing. Additionally, these would be best employed late in the day and late in the week.

2. The public is acting in a generally responsible fashion in reporting drinking drivers, as over 10% of those charged were reported by the public. Therefore it is recommended that resources be directed to further encourage this behaviour on the part of the public, and to make more effective the ability of the police to respond to such reports.

3. Inasmuch as there is a higher likelihood that a driver will plead guilty when there is BAC evidence in court, and therefore

will save court costs and time by doing so, it is recommended that resources be directed toward increasing the availability of BAC information to the police (e.g., mandatory blood tests).

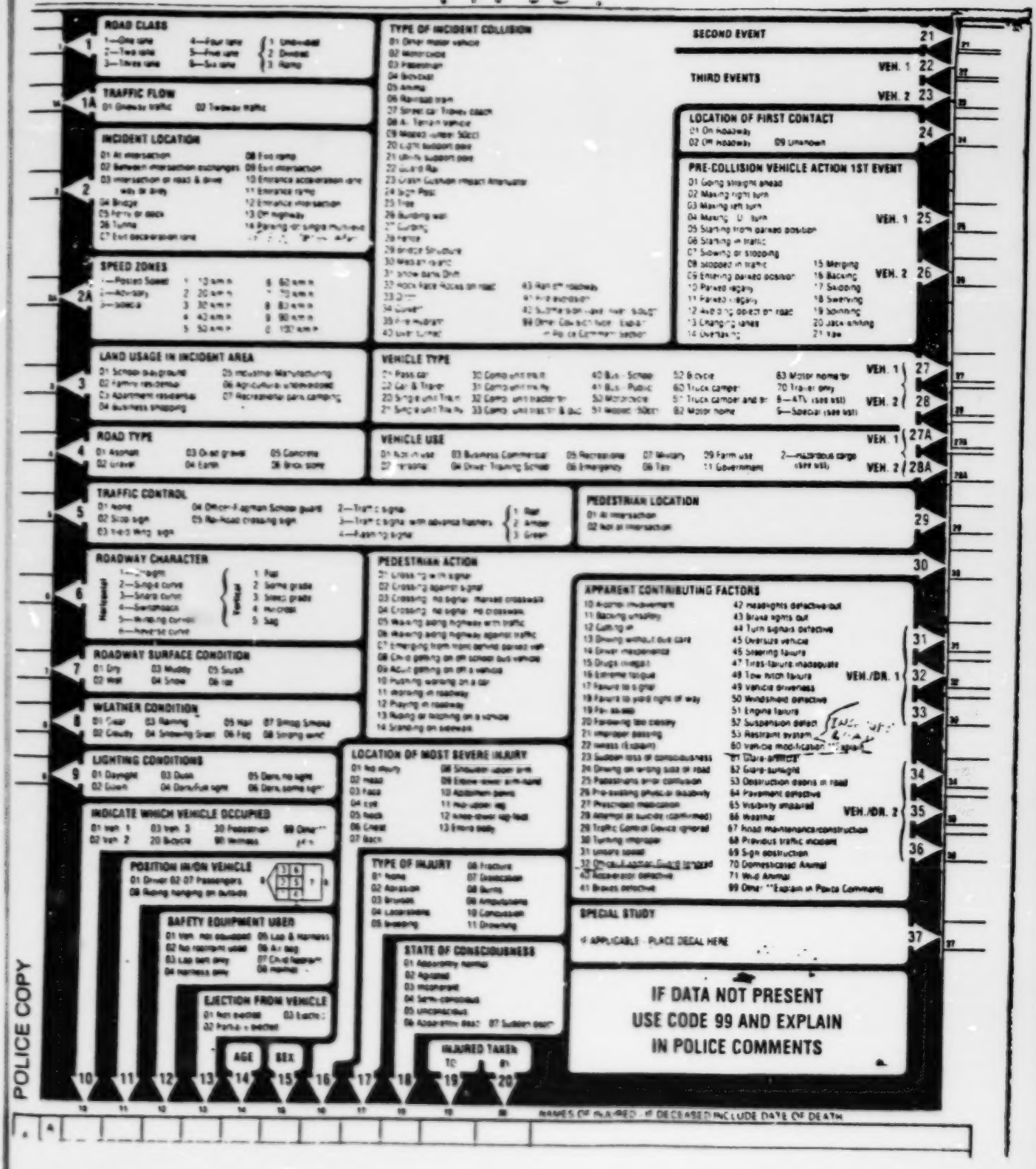
4. The chronic drinking driver is not responding to the current sanctions imposed by the court, and thus it is recommended that research be undertaken into finding more effective sanctions and/or treatment for this group.

5. Considering the positive relationship between BAC level and the likelihood of being involved in an accident, it is recommended that the courts consider using BAC level as a major criterion in determining the severity of sentencing.

In conclusion, these data suggest that the Criminal Justice System is generally effective in dealing with the impaired drivers that are apprehended, but that the level of apprehensions is distressingly low. Of course, one approach to raising the low level of apprehension is to substantially increase the Criminal Justice System resources allocated to discouraging drinking drivers. However, the increase in resources would have to be substantial indeed as, assuming 10% of the registered vehicles to be on the road, only about 1.3% of the legally impaired drivers are apprehended and charged. Perhaps the Criminal Justice System ought to focus on the 17% of impaired drivers who have a BAC of 140+ mg./ 100 ml. and who have a higher likelihood of being involved in accidents. Again, this could be done by linking sanctions to BAC levels, and would not involve any changes in the Criminal Code. It is therefore the final recommendation of this paper that further research be conducted on the contribution of BAC level to the probability of being in an accident.

APPENDIX C

TRAFFIC ACCIDENT REPORT FORM (MV104) TEMPLATE


ROAD CLASS
1—One-way
2—Two-way
3—Three-way
4—Four-way
5—Five-way
6—Six-way
1 Undivided
2 Divided
3 Ramp
TRAFFIC FLOW
01 One-way traffic
02 Two-way traffic
INCIDENT LOCATION
01 At intersection
02 Between intersection exchanges
03 Intersection of road & drive-way or alley
04 Bridge
05 Ferry or dock
06 Tunnel
07 Exit deceleration lane
08 Exit ramp
09 Exit intersection
10 Entrance acceleration lane
11 Entrance ramp
12 Entrance intersection
13 On highway
14 Parking or service area
SPEED ZONES
1—Posted Speed
2—Advisory
3—Safest
1 10 km/h
2 20 km/h
3 30 km/h
4 40 km/h
5 50 km/h
6 60 km/h
7 70 km/h
8 80 km/h
9 90 km/h
0 100 km/h
LAND USAGE IN INCIDENT AREA
01 School playground
02 Family residence
03 Apartment residence
04 Business shopping
05 Industrial Manufacturing
06 Agriculture undeveloped
07 Recreational park camping
ROAD TYPE
01 Asphalt
02 Gravel
03 Dirt or gravel
04 Earth
05 Concrete
06 Brick, stone
TRAFFIC CONTROL
01 None
02 Stop sign
03 Yield sign
04 Officer or person School guard
05 Railroad crossing sign
2—Traffic signal
3—Traffic signal with advance flashers
4—Flashing signal
1 Red
2 Amber
3 Green
ROADWAY CHARACTER
Horizontal
1—Straight
2—Slight curve
3—Sharp curve
4—Switchback
5—Winding curve
6—Reverse curve
Vertical
1 Flat
2 Some grade
3 Steep grade
4 Hillcrest
5 Sag
ROADWAY SURFACE CONDITION
01 Dry
02 Wet
03 Muddy
04 Snow
05 Slush
06 Ice
WEATHER CONDITION
01 Clear
02 Cloudy
03 Raining
04 Snowing/Sleet
05 Hail
06 Fog
07 Smog/Smoke
08 Strong wind
LIGHTING CONDITIONS
01 Daylight
02 Dawn
03 Dusk
04 Dark/Full light
05 Dark, no light
06 Dark, some light
INDICATE WHICH VEHICLE OCCUPIED
01 Veh. 1
02 Veh. 2
03 Veh. 3
20 Bicycle
30 Pedestrian
99 Other**
POSITION IN/ON VEHICLE
01 Driver 02 Passengers
09 Rider hanging on outside
SAFETY EQUIPMENT USED
01 Veh. not equipped
02 No restraint used
03 Lap belt only
04 Harness only
05 Lap & Harness
06 Air bag
07 Child restraint
08 Helmet
EJECTION FROM VEHICLE
01 Not ejected
02 Partially ejected
03 Ejected
AGE
SEX
TYPE OF INCIDENT COLLISION
01 Other motor vehicle
02 Motorcycle
03 Pedestrian
04 Bicyclist
05 Animal
06 Railroad train
07 Street car/Trolley coach
08 All-Terrain vehicle
09 Moped (under 50cc)
20 Light support pole
21 Utility support pole
22 Guard Rail
23 Crash Cushion/Impact Attenuator
24 Sign Post
25 Tree
26 Building wall
27 Curbing
28 Fence
29 Bridge Structure
30 Median curb
31 Snow bank/Drift
32 Rock/Rock Fall/Rock on road
33 Other
34 Culvert
35 Pole/Support
40 Ditch/Curb/Bank
41 Fell/Jumped/Pushed from vehicle
42 Submerged (not from vehicle)
43 Fell off roadway
44 Fire/explosion
99 Other (Describe in Police Comments)
SECOND EVENT
THIRD EVENTS
VEH. 1
VEH. 2
LOCATION OF FIRST CONTACT
01 On roadway
02 Off roadway
09 Unknown
PRE-COLLISION VEHICLE ACTION 1ST EVENT
01 Going straight ahead
02 Making right turn
03 Making left turn
04 Making U-turn
05 Starting from parked position
06 Starting in traffic
07 Slowing or stopping
08 Stopped in traffic
09 Entering parked position
10 Parked legally
11 Parked illegally
12 Avoiding object on road
13 Changing lanes
14 Overtaking
15 Merging
16 Backing
17 Skidding
18 Swerving
19 Spinning
20 Jackknifing
21 Ran
VEHICLE TYPE
01 Pass car
02 Car & Trailer
03 Single unit Truck
21 Single unit Truck
30 Comb unit truck
31 Comb unit truck
32 Comb unit tractor
33 Comb unit tractor & pole
40 Bus - School
41 Bus - Public
50 Motorcycle
51 Motorcycle
52 Bicycle
60 Truck camper
61 Truck camper and trailer
62 Motor home
63 Motor home tow
70 Trailer only
8—ATV (use vsu)
9—Special (use vsu)
VEHICLE USE
01 Personal use
02 Commercial
03 Business Commercial
04 Driver Training School
05 Recreational
06 Emergency
07 Military
08 Taxi
09 Farm use
11 Government
2—Hazardous cargo (use vsu)
PEDESTRIAN LOCATION
01 At intersection
02 Not at intersection
PEDESTRIAN ACTION
01 Crossing with signal
02 Crossing against signal
03 Crossing, no signal, marked crosswalk
04 Crossing, no signal, no crosswalk
05 Walking along highway with traffic
06 Walking along highway against traffic
07 Emerging from/from behind parked veh
08 Child getting on/off school bus/vehicle
09 Adult getting on/off a vehicle
10 Pushing/working on a car
11 Working in roadway
12 Playing in roadway
13 Riding or walking on a vehicle
14 Standing on sidewalk
APPARENT CONTRIBUTING FACTORS
10 Animal movement
11 Backing unsafely
12 Cutting in
13 Driving without due care
14 Driver inexperience
15 Drugs (illegal)
16 Extreme fatigue
17 Failure to give
18 Failure to yield right of way
19 Fire related
20 Following too closely
21 Improper passing
22 Illness (explain)
23 Sudden loss of consciousness
24 Driving on wrong side of road
25 Pedestrian error/confusion
26 Pre-existing physical disability
27 Prescribed medication
28 Attempt at suicide (confirmed)
29 Traffic Control Device ignored
30 Turning improper
31 Unsafe speed
32 Other Motor Vehicle ignored
42 Headlights defective/out
43 Brake lights out
44 Turn signals defective
45 Oversize vehicle
46 Steering failure
47 Tires-failure inadequate
48 Tow hitch failure
49 Vehicle driverless
50 Windshield defective
51 Engine failure
52 Suspension defect
53 Restraint system
60 Vehicle modification**
61 Glare-artificial
62 Glare-sunlight
63 Obstruction-doors in road
64 Pavement defective
65 Visibility impaired
66 Weather
67 Road maintenance/construction
68 Previous traffic incident
69 Sign obstruction
70 Domesticated Animal
71 Wild Animal
99 Other **Explain in Police Comments
VEH./DR. 1
VEH./DR. 2
LOCATION OF MOST SEVERE INJURY
01 No injury
02 Head
03 Face
04 Eye
05 Neck
06 Chest
07 Back
08 Shoulder-upper arm
09 Elbow-lower arm-hand
10 Abdomen-pelvis
11 Hip-upper leg
12 Knee-lower leg-foot
13 Entire body
TYPE OF INJURY
01 None
02 Abrasion
03 Bruise
04 Laceration
05 Swelling
06 Fracture
07 Dislocation
08 Burns
09 Amputations
10 Concussion
11 Drowning
STATE OF CONSCIOUSNESS
01 Apparently normal
02 Agitated
03 Incoherent
04 Semi-conscious
05 Unconscious
06 Apparently dead
07 Sudden death
INJURED TAKEN TO
SPECIAL STUDY
IF APPLICABLE - PLACE DECAL HERE
IF DATA NOT PRESENT
USE CODE 99 AND EXPLAIN
IN POLICE COMMENTS
POLICE COPY
NAMES OF INJURED - IF DECEASED INCLUDE DATE OF DEATH

APPENDIX D

CANADIAN CRIMINAL CODE SECTIONS 234, 235, 236

DRIVING WHILE ABILITY TO DRIVE IS IMPAIRED—Conditional and absolute discharge.

234. (1) Every one who, while his ability to drive a motor vehicle is impaired by alcohol or a drug, drives a motor vehicle or has the care or control of a motor vehicle, whether it is in motion or not, is guilty of an indictable offence or an offence punishable on summary conviction and is liable

(a) for a first offence, to a fine of not more than two thousand dollars and not less than fifty dollars or to imprisonment for six months or to both;

(b) for a second offence, to imprisonment for not more than one year and not less than fourteen days; and

(c) for each subsequent offence, to imprisonment for not more than two years and not less than three months. 1968-69, c. 38, s. 16; 1974-75-76, c. 93, s. 14(1).

(2) Notwithstanding subsection 662.1(1), where an accused pleads guilty to or is found guilty of an offence under subsection (1), the court before which he appears may, after hearing medical or other evidence, if it considers that the accused is in need of curative treatment in relation to his consumption of alcohol or drugs and that it would not be contrary to the public interest, instead of convicting the accused, by order direct that the accused be discharged upon conditions prescribed in a probation order, including a condition respecting his attendance for curative treatment in relation to his consumption of alcohol or drugs, and the provisions of subsections 662.1(2) to (4) apply *mutatis mutandis*. 1974-75-76, c. 93, s. 14(2).

SAMPLES OF BREATH WHERE REASONABLE BELIEF OF COMMISSION OF OFFENCE UNDER S. 234 OR 236—Failure or refusal to provide sample.

235. (1) Where, a peace officer on reasonable and probable grounds believes that a person is committing, or at any time within the preceding two hours has committed, an offence under section 234 or 236, he may, by demand made to that person forthwith or as soon as practicable, require him to provide then or as soon thereafter as is practicable such samples of his breath as in the opinion of a qualified technician referred to in subsection 237(6) are necessary to enable a proper analysis to be made in order to determine the proportion, if any, of alcohol in his blood, and to accompany the peace officer for the purpose of enabling such samples to be taken.

(2) Every one who, without reasonable excuse, fails or refuses to comply with a demand made to him by a peace officer under subsection (1) is guilty of an indictable offence or an offence punishable on summary conviction and is liable

(a) for a first offence, to a fine of not more than two thousand dollars and not less than fifty dollars or to imprisonment for six months or to both;

(b) for a second offence, to imprisonment for not more than one year and not less than fourteen days; and

(c) for each subsequent offence, to imprisonment for not more than two years and not less than three months. 1968-69, c. 38, s. 16; 1974-75-76, c. 93, s. 16.

DRIVING WITH MORE THAN 80 MGS. OF ALCOHOL IN BLOOD — Conditional and absolute discharge.

236. (1) Every one who drives a motor vehicle or has the care or control of a motor vehicle, whether it is in motion or not, having consumed alcohol in such a quantity that the proportion thereof in his blood exceeds 80 milligrams of alcohol in 100 millilitres of blood, is guilty of an indictable offence or an offence punishable on summary conviction and is liable

(a) for a first offence, to a fine of not more than two thousand dollars and not less than fifty dollars or to imprisonment for six months or to both;

(b) for a second offence, to imprisonment for not more than one year and not less than fourteen days; and

(c) for each subsequent offence, to imprisonment for not more than two years and not less than three months.

(2) Notwithstanding subsection 662.1 (1), where an accused pleads guilty to or is found guilty of an offence under subsection (1), the court before which he appears may, after hearing medical or other evidence, if it considers that the accused is in need of curative treatment in relation to his consumption of alcohol and that it would not be contrary to the public interest, instead of convicting the accused, by order direct that the accused be discharged upon conditions prescribed in a probation order, including a condition respecting his attendance for curative treatment in relation to his consumption of alcohol, and the provisions of subsections 662.1(2) to (4) apply *mutatis mutandis*. 1939, c. 41, s. 15; 1968-69, c. 38, s. 16; 1974-75-76, c. 93, s. 17.

APPENDIX E

POLICE REPORTING DETACHMENTS

APPENDIX E

RURAL/MUNICIPAL/INDEPENDENT/OTHER
REPORTING DETACHMENTS

For the purpose of the Motor Vehicle Branch Accident Tape analyses, the following reporting detachments are grouped under the following headings:

RCMP DETACHMENTS

Kelowna Subdivision

Kelowna Rural

Armstrong
Enderby
Falkland
Kelowna Rural
Keremeos
Lumby
Oliver
Osoyoos
Pentiction Rural
Princeton
Revelstoke
Salmon Arm Rural
Sicamous
Summerland Rural
Vernon Rural

Kelowna Municipal

Kelowna Mun.
Penticton Mun.
Salmon Arm Mun.
Summerland Mun.
Vernon Mun.

Kamloops Subdivision:

Kamloops Rural

Alexis Creek
Anahim Lake
Ashcroft
Barriere
Blue River
Chase
Clearwater
Clinton
Kamloops Rural
Lillooet
Logan Lake
Lytton
Merritt Rural
100 Mile House
Spences Bridge
Valemount
Williams Lake Rural

Kamloops Municipal

Kamloops Mun.
Merritt Mun.
Williams Lake Mun.

Nelson Subdivision

Nelson Rural

Castelgar Rural
Cranbrook Rural
Crescent Valley
Creston
Fernie
Field
Fruitvale
Golden
Grand Forks
Invermere
Kaslo
Kimberley Rural
Midway
Nakusp
Nelson
New Denver
Radium
Rossland
Salmo
Sparwood
Trail Rural

Nelson Municipal

Castlegar Mun.
Cranbrook Mun.
Kimberley Mun.
Trail Mun.

Prince George Subdivision

Prince George Rural

Burns Lake
Chetwynd
Dawson Creek Rural
Fort Nelson
Fort St. James
Fort St. John Rural
Fraser Lake
Hudson Hope
Mackenzie Rural
McBride
Prince George Rural
Quesnel Rural
Vanderhoof
Wells
Watson Lake, Teslin

Prince George Municipal

Dawson Creek Mun.
Fort St. John Mun.
Quesnel Mun.
Mackenzie Mun.
Prince George City Mun.

Prince Rupert Subdivision

Prince Rupert Rural

Atlin
Bella Coola
Bella Bella
Cassiar
Dease Lake
Granisle
Hazelton
Houston
Kitimat Rural
Masset
New Aiyansh (Pr. Rup.)
Ocean Falls
Prince Rupert Rural
Queen Charlotte City
Smithers
Stewart
Telegraph Creek
Terrace Rural

Prince Rupert Municipal

Kitimat Mun.
Prince Rupert Mun.
Terrace Mun.

Lower Mainland Subdivision (District 1)

Lower Mainland Rural

Abbotsford Rural
Agassiz
Boston Bar
Chilliwack Rural
Coquitlam Rural
Haney Rural
Hope
Gibsons
Maple Ridge Rural
Mission Rural
Sechelt
Squamish Rural
University
Pemberton
Whistler
Vancouver Bowen Island

Lower Mainland Municipal

Abbotsford Mun.
Burnaby
Chilliwack Mun.
Chilliwack Township
Coquitlam Mun.
Haney Mun.
Langley City Mun.
Langley Township Mun.
Maple Ridge Mun.
Mission Mun.
North Vancouver City
North Vancouver District
Port Coquitlam
Richmond
Squamish Mun.
Surrey
White Rock

Victoria Sudivision

Victoria Rural

Colwood
Duncan
Gabriola Island
Ganges
Ladysmith
Lake Cowichan
Nanaimo Rural
Pender Island
Shawnigan Lake
Sidney Rural
Sooke

Victoria Municipal

Chemainus
Duncan-N. Cowichan Mun.
Nanaimo Mun.
Sidney Mun.

Courtenay Subdivision

Courtenay Rural

Alert Bay
Campbell River Rural
Courtenay Rural
Gold River
Parksville
Port Alberni Rural
Port Alice
Port Hardy
Port McNeill
Powell River Rural
Quadra Island
Sayward
Tahsis
Tofino
Ucluelet

Courtenay Municipal

Campbell River Mun.
Comox Mun.
Courtenay Mun.
Port Alberni Mun.
Powell River Mun.

Freeway RCMP

Unit A Freeway
Unit B Freeway
Unit C Freeway

INDEPENDENT DETACHMENTS

Vancouver Area Independents

Delta
Matsqui
New Westminster
Port Moody
Vancouver City
West Vancouver

Victoria Area Independents

Victoria City
Saanich
Central Saanich
Esquimalt
Oak Bay

Nelson Area Independents

Nelson

OTHER POLICE

National Hbrs. Brd. Police
C.N.R. Police Vancouver
C.P.R. Police Vancouver
BCHP 2nd Narrows Bridge
BCHP Lions Gate Bridge
BCHP Port Mann Bridge
BCHP Oak St. Bridge
BCHP Middle Arm Bridge
George Massey Tunnel
Tsawassen Terminal
Swartz Bay Terminal
Horseshoe Bay Terminal
Departure Bay Terminal
Langdale Terminal
Military Police

POOR

QUALITY

ORIGINAL